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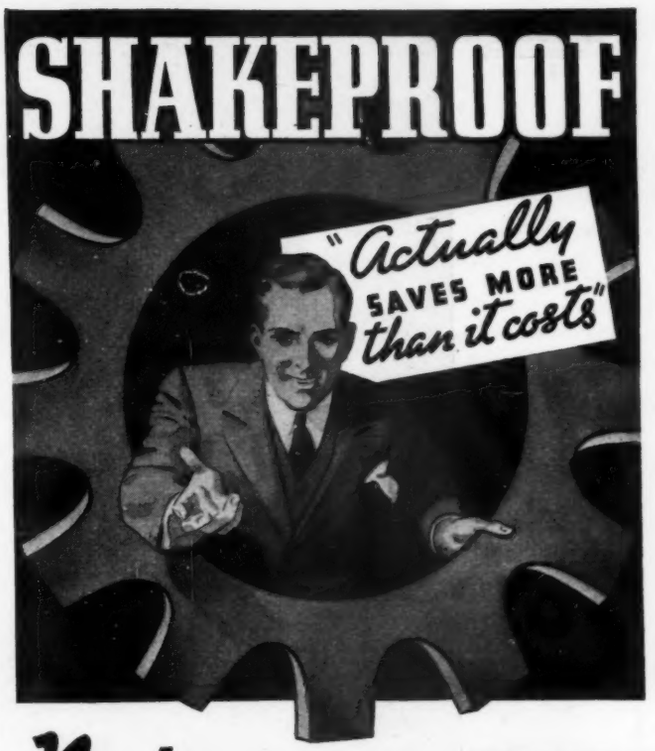

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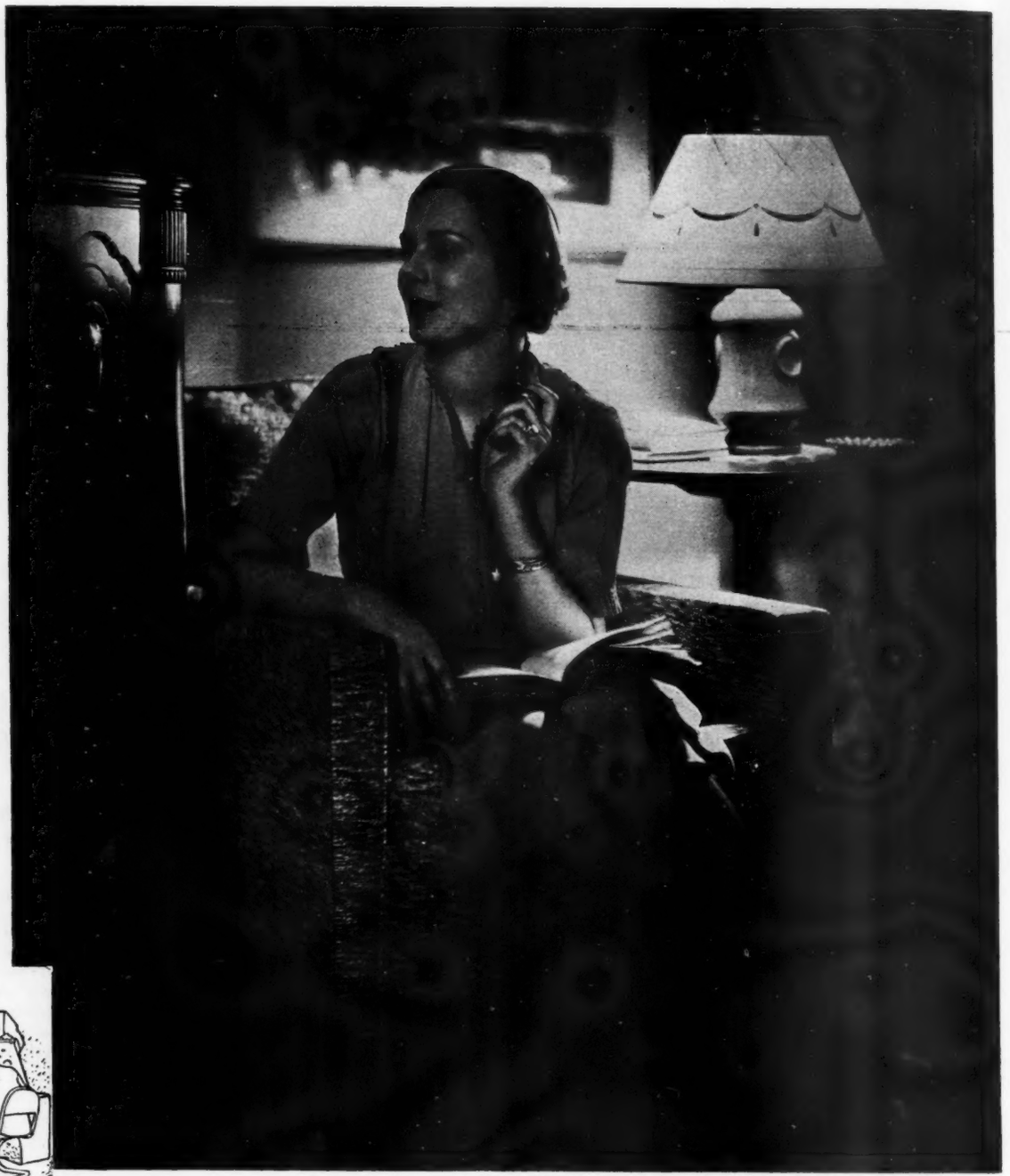

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AUTOMOTIVE INDUSTRIES

Vol. 72, No. 17 ▫ THIRTY-SEVENTH YEAR ▫ April 27, 1935

April May Top 468,281 of '30

Operating Rate Exceeds March Deliveries Take Upward Trend

by Harold E. Gronseth

Detroit News Editor, Automotive Industries

With retail demand still expanding, there is no let-up in the production rate of the motor industry which already has turned out more vehicles than in all of 1932 when output totaled 1,431,494 units. That mark was passed during the third week of April. The output so far this year is equal to more than eight months of the 1933 production and is about five weeks up on 1934 when the corresponding figure was not reached until the second week of June.

Most plants have been operating at a better rate than in March, so that the current month should exceed by a comfortable margin the March production of 451,805 cars and trucks in the U. S. and Canada. It stands a fair chance of setting a new high since 1929, exceeding the 1930 peak of 468,281 units reached in April of that year.

The strike at the Chevrolet Toledo plant is having no effect on current production of Chevrolet and Pontiac, for which that plant makes parts, and is not likely to affect assembly operations of these companies unless the strike runs into several weeks' duration.

Responding to better weather and the spring sales drives now under way, retail deliveries last week resumed the upward trend which had been interrupted in some instances by the unfavorable weather conditions of the preceding week.

Farm demand is playing a big part in the spring sales gains. Reports from rural sections are uniformly encouraging. Sales executives say that the agricultural picture has changed completely for the better since last year, that farmers are receiving relatively high prices for their products, the returns from which, together with Government money, are being invested in much needed equipment including new automobiles.

In a survey of 372 Buick dealers whose sales during the first quarter of 1935 passed the total for all of 1934 it is disclosed that nearly all of these dealers do business with farmers and small merchants.

Buick dealers in 59 towns sold more cars in the first quarter this year than in all of 1934. Another 313 Buick dealers reached 50 per cent or more of their 1934 volume during the first quarter, while there is a long list just below the 50 per cent mark. The territories in which these large sales gains were made are rural in character. Average population of the 50 towns was slightly over 5000.

Reports from the first 13 cities where General Motors spring showings have been held are uniformly encouraging, showing decided improvement over last year. Attendance is up generally 20 per cent. Accurate sales figures are not yet available but preliminary figures indicate that the increased crowds are buying crowds. The 13 cities where the showings have been completed are: Louisville, Milwaukee, Philadelphia, Providence, Toledo, Tulsa, Washington, D. C., Atlanta, Birmingham, Buffalo Detroit, Newark, N. J., and Boston. No shows were held during Holy Week but seven are in progress this week.

(*Turn to page* 586, *please*)

C. A. Triphagen

Reo Promotes Triphagen To Former Sales Post

C. A. Triphagen, who has been Reo's sales manager for the past year, has been named general sales manager in charge of all selling operations, according to an announcement by Don E. Bates, president and general manager. Mr. Triphagen's promotion returns him to a post he held for a considerable period some years back up to his resignation in September, 1928.

W. Ward Mohun, assistant Reo sales manager and one-time head of truck sales at Willys-Overland, succeeds Mr. Triphagen as sales manager in charge of the domestic division. C. E. Boutelle, who has been in charge of the eastern division, becomes assistant sales manager of the domestic division.

AFL Blames ALB's Bargaining Election Policy for Chevrolet Strike at Toledo

DETROIT, Nov. 24—The Automobile Labor Board is blamed by the United Automobile Workers of America, affiliated with the A. F. of L., for the Chevrolet Toledo strike, in a telegram dispatched Wednesday to Secretary of Labor Frances Perkins by George Addes, financial secretary of the union, in which he says: "The inconsistency and contradictory formula enunciated by the Wolman Board in elections for collective bargaining purposes largely is responsible for the strike by 2300 employees of Chevrolet Motor Company, Toledo. Management is using the Wolman Board as a subterfuge for refusal to negotiate directly with duly accredited representatives of the A. F. of L. Substitution of a board capable of interpreting needs and rights of these workers under the law would contribute sub-

(*Turn to page* 586, *please*)

NRA to Continue Open Price Filing; No Output Control Except in Crisis

Open price filing will be continued in industries where it is now in effect and does not conflict with the new NRA open-price policy announced on Tuesday of this week. Waiting periods generally are condemned but will be continued under certain conditions. The new policy strikes a new note in opposing restriction of output which will be permitted in the future only in emergencies such as when there is destructive price cutting.

The new policy is dependent on action by Congress in extending NRA, the present plan being not to approve any new proposal until Congress has acted.

"Price filing," the NRA announcement says, "should be administered to serve the ends of a free and open market. An impartial and confidential body should be the administrative agency in order that price lists may be distributed to members of the industry and their customers without partiality and without efforts to influence the quotations. The prices must be genuinely available to all customers and members of the industry. If the body with which prices are filed is a private agency, its activities must be subject to the immediate oversight of the government. It is also essential . . . that the filed prices be those at which sales are acutally to take place rather than merely minima above which members of an industry may secretly vary their prices as they choose or maxima from which discounts are to be allowed." "As an alternative to open price filing, filing data on sales in the past, rather than current quotations, may serve . . . in some industries."

In its announcment regarding open-price filing, NRA said:

"The device of open-price filing should be perfected, guarded against abuse and applied with discrimination to the industries to which it is appropriate. In certain industries and for certain commodities for which an organized open market is not practical, the virtues of an organized commodity exchange may be approximated through the device of open price filing."

The burden of proof that a proposal contrary to announced policy is necessary must rest with the applicant industry, the board explained. Unless such proof is furnished the rules provide that no new provision contrary to policy will be approved, and no approved provision contrary to policy requiring further NRA action to become effective, will be put into effect. At the expiration of any trial period of any contrary-to-policy provision, opportunity will be given its sponsors to show cause for continuing the period of trial or making the provision permanent.

The board draws a sharp distinction between price filing and price fixing.

"Competition is supposed to effect uniformity of price through an open market," the board stated, "and an approximation of uniformity is almost certain to result from the proper maintenance of open-price filing. It is when prices quoted by members of an industry move in concert faster than competition can easily accommodate themselves to each other's activities or when prices move uniformly upward in contrast to trends in related industries that evidence of collusion is evident."

Dealing with restriction of output, the board indicates clearly that it has turned to a single end, "an economy, not of scarcity, but of plenty," and thus may be expected to order elimination of many code provisions which physically restrain output.

"In a few industries, in which competition has proved unusually disorderly, it may be necessary to intervene to bring production into line with demand," the board said, "but such intervention should avoid 'restriction of output' and should aim at the kind of equation between production and consumption as the market is supposed to effect. The strategy of policy must find expression in a multiple of decisions."

Interpreted, this declaration was said to mean that while bars will be lifted against physical restriction, output may be reduced by resorting to means to halt destructive price cutting.

March Retail Car Financing Gained 41% Over Year Ago

Preliminary estimates of the dollar volume of retail financing of new passenger cars by the Department of Commerce shows an increase of 41 per cent for March, as compared with the same month of 1934. Compared with February the increase is approximately 35 per cent.

The aggregate volume for the first three months of this year was 53 per cent above the first quarter of 1934 and 168 per cent above the corresponding period of 1933, according to Department reports.

First Half Million V-8's Off Assembly Line Monday

The 500,000th Ford V-8 manufactured since January 1 came off the final assembly line at the Rouge Plant of the Ford Motor Co. soon after the plant began work Monday morning. This does not include the 36,000-odd 1935 Ford units produced during November and December, 1934.

The completion of the 500,000th Ford V-8 unit marked the half-way point in the Ford program for the year, based upon Henry Ford's announcement last December of his plans to build "one million cars or better" in 1935. Ford production for the first four months through April 30 is expected, according to present schedules, to approximate 550,000 units. First quarter production totaled 386,326 units and the schedule for April calls for 165,000 more.

Continental Receives Two Orders Totaling $920,000

Continental Motors reports that it has closed a three-year contract with a large manufacturer of agricultural equipment, covering a new type of engine specially developed for use in that particular field. This engine can be operated on either gasoline or No. 1 fuel oil. This new type of engine is the result of research work which has been conducted for several months in Continental's Muskegon plant.

The initial release against this contract provides for the delivery of engines amounting in value to $500,000, the production of which will start in the early fall of this year.

Continental has also received an order and releases from a large commercial truck manufacturer for standard engines representing a value of approximately $420,000.

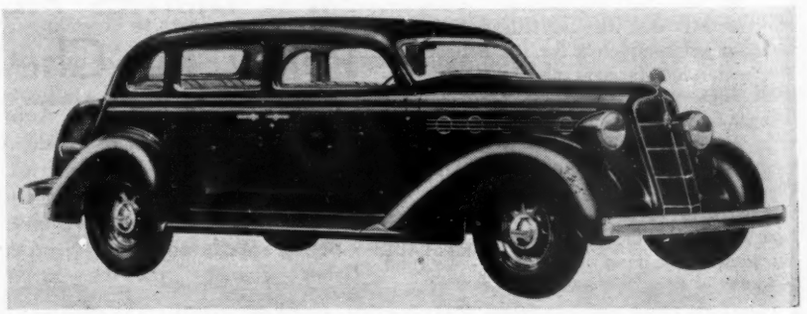
England, Germany Loom As Harmsworth Challengers

Definite word has been received in this country that a new boat is being built in England and that it will form the basis of a challenge next year for the Harmsworth Trophy, held since 1920 by Commodore Gar Wood, of Detroit. Details are being held in the greatest secrecy.

It is understood, also, that the manufacturers of the Mercedes-Benz engines, in Germany, have adapted their big V-type, 12-cylinder aero engine to marine use and have boosted it to 1600 horsepower. American motor boat officials see in this a possible Harmsworth challenge from Germany.

Veal Returns to Office

C. B. Veal, research manager of the S.A.E., has returned to his office after a prolonged illness.



New 128-inch wheelbase DeLuxe Traveler Sedan announced recently by Plymouth Motor Corporation. The car has an overall length of approximately 200 inches with a built-in trunk on the rear.

George S. Piroomoff

New Brockway president, whose election was forecast last week in Automotive Industries. He succeeds Robert F. Black who has become president of White. Mr. Piroomoff was formerly Brockway's vice-president in charge of engineering.

NADA Inaugurates Continuous, Current, Comprehensive Retail Business Survey

A continuous, highly current, comprehensive, detailed survey of the entire retail automobile business has been inaugurated by the National Automobile Dealers Association, according to that organization's latest bulletin. The survey "will depict conditions of every nature to the trade in every city, every state, in regions and nationally."

Complete sets of forms to cover 1933, 1934, and each month of 1935, are being distributed to dealers, and they call for all items of income and outgo "even to the postage stamps in every department. . . ." The individual returns made by dealers will be held confidential. The information they provide will be available to NADA executives "within ten days after the first of each month."

The factual data will be used to enhance profit possibilities and to help dealers in the management of their businesses. The information also "could well constitute effective facts of NADA and its dealer membership" in negotiations on factory-dealer relationships." "It will arm NADA with indisputable facts of a convincing nature for the revision of contracts, territorial restrictions, dealer potentials, . . ."

The NADA recognizes that the effectiveness of the survey hinges on how closely dealers cooperate in contributing individual information promptly but states that, "No difficulty is expected because it is the dealers' own demand." There is a possibility that expectations in this regard are overly sanguine. Moreover, the speed with which the data are to be compiled and the detailed nature of the facts requested, indicate that the job the NADA has laid out for itself is of truly gigantic proportions and the association's bulletin describes it as such.

"With proper cooperation of the 30,000 dealers," the announcement of the survey concludes, "the opportunity for progress, for the elimination of losses, for greater benefits in factory relations, will be the greatest that has yet been devised since or before their code of fair trade practices brought them together in a united organization for mutual helpfulness. No other one thing could be devised that would make that unity of purpose more vigorous, virile, and permanent. It will stabilize membership as no other one thing. It will demand the member's adherence to organization support in order to make available the current and vitally important information that will come from this continuous survey."

Roxalin Has New Enamel

A new finish recently developed by the Roxalin Flexible Lacquer Co., Elizabeth, N. J., is claimed will hide imperfections of metal surfaces. Taupe Enamel No. 978A is reported as a finish which gives an optical illusion camouflaging the irregular surface of metal castings by color. Also, it is said, this finish does not mar or finger print, and at the same time has real flexibility and adhesion which means this finish will not chip, flake or peel.

Kelsanite, New Surface Protector to Be Produced

Kelsanite, a new product by a Michigan firm, in one particular form serves as a masking adhesive for the protection of surfaces adjacent to those being lacquered, and as a protective coating to insure metal parts against corrosion or injury in storage or shipment. It is said to combine high adhesive qualities with the ability to remove it without leaving a trace by merely stripping off the coating when it has performed its function. The coating itself will absorb any loose dirt or moisture that may be on the surface of the article, and when it is finally stripped off, all such foreign material will come off with it. The coating is applied like paint. A formal announcement is to be made at an early date.

March Output 451,805 Units; Third Largest for Month in Motor History

Final Census Bureau figures on motor vehicle production in March show that output reached the third largest total for that month in the history of the industry. Only in March, 1926 and 1929, was this year's total of 451,805 cars and trucks exceeded, which represented gains of 28.1 per cent over last year and of 26 per cent over February.

The high rate of operations in United States and Canada in March lifted the first quarter total to 1,113,835, an increase of 47.9 per cent over the corresponding months in 1934, and the largest total for the first three months since 1929.

Passenger car output totaling 909,494 in the first quarter was nearly 51 per cent larger than in 1934. In March, car output amounted to 379,992, a gain of 30.8 per cent over the same month last year and of 30.1 per cent over February, 1935.

Truck production increased 17.8 per cent over March a year ago and 7.8 per cent over February to a total of 71,813. Total output of trucks in the first three months was 204,340, a gain of 35.3 per cent over the first three months of 1934.

The detailed figures follow:

Three Months Production
(U. S. and Canada)

	Cars	Trucks	Total Motor Vehicles
March, 1935	379,992	71,813	451,805
Feb., 1935	292,035	66,623	358,658
March, 1934	291,546	61,068	352,614
1st Quarter, 1935	909,495	204,340	1,113,835
1st Quarter, 1934	603,121	150,890	754,011
Per Cent Change			
March, '35, over '34	+30.8	+17.8	+28.1
March, '35, over Feb., '35	+30.1	+ 7.8	+26.0
1st Quarter, '35, over '34	+50.7	+35.3	+47.9

March production was exceeded only by March, 1929, when 626,076 were produced, and March, 1926, when 455,841 were produced.

Highest 1st Quarter since 1929 when 1,546,319 vehicles were produced and 1926 when 1,162,808 were produced.

Lippart Named President of Tool Engineers Society

Robert M. Lippart, Heald Machine Co., has been elected president of the American Society of Tool Engineers and took office on April 11 to serve for one year. Other officers elected are Ford R. Lamb, Consolidated Machine Tool Co., first vice-president; W. Maxwell Gray, Congress Tool & Die Co., second vice-president; B. L. Diamond, Duplex Equipment Co., treasurer, and Albert M. Sargent, Pioneer Engineering and Manufacturing Co., secretary.

Postpone APEM Code Case

The National Industrial Recovery Board has announced the public hearing on the definition contained in the APEM code scheduled for April 23 has been postponed until further notice.

Outcome of Chevrolet Strike Obscure as Union Votes on Company Proposals

TOLEDO, April 25—The outcome of the strike called Tuesday morning at the Chevrolet plant here continues obscure with local labor leaders predicting that the union will reject company proposals when members vote on them at a meeting tomorrow night.

The meeting is being held presumably in response to a demand by the company that "our proposals, as given to the committee, be submitted to the men in a body and a vote taken as to its acceptance. . . . The plant will remain closed until we know definitely the verdict of our employees as a whole."

General Organizer F. J. Dillon, who conferred with Labor Secretary Perkins in Washington yesterday, is said to have advised the vote and is believed to be rapidly taking direction of the strike out of the hands of leaders here. Alfred P. Sloan, Jr., president of General Motors, has been invited to witness the balloting.

Although apparently acting on the evidence of strength revealed by the primary election recently held by the Automobile Labor Board in which 1327 workers out of 2140 voting, indicated A. F. of L. affiliation, the union has refused to recognize the Board as a mediator. Thomas J. Williams, labor conciliator sent here by Secretary Perkins, will take up the task of trying to effect a settlement on his arrival here today.

The union meeting scheduled for tomorrow night is expected to give an indication of the number desirous of continuing the strike. About 700 attended a meeting held Tuesday night. In some quarters here it is felt that about 400 are enthusiastic for the walkout and the interest of the balance is limited to the few dollars they have invested in union dues.

An effort is being made by labor leaders to make abolition of the Automobile Labor Board an issue. Specifically the union is demanding a signed contract which it contends does not mean a closed shop. The contract proffered consisted of 29 demands covering representation organization, discrimination, the 7½-hr. five day week, time and a half for overtime and double time for Sundays and holidays, use of company bulletin boards, seniority, merit to be determined by the shop committee, 70 cents per hour minimum with a minimum increase of five cents per hour for all employees, committee to have a voice in retiming jobs, weekly pay days, etc. The company accepted some of these demands, rejected others and made some counter-proposals.

In the company proposals an offer was made to increase all wages five per cent, readjust rates out of balance to within 10 per cent of the higher bracket, apply the flat increase on top of readjustments, make available any employee's seniority and service record to him on request, enforce rigidly the seniority rules of the Automobile Labor Board, meet with duly accredited representatives of any group of employees, no discrimination to be shown against any member of the executive shop committee, and agreed in principle for payment of time of shop committee members spent in settlement of grievances.

General Motors explained its position officially in a statement issued by Alfred P. Sloan, Jr., the day the strike was called, which said:

"The Toledo Plant of the Chevrolet Motor Division closed down this morning as a result of a strike. This followed protracted negotiations between the management and a self-appointed committee of the Local Labor Union No. 18384. These negotiations were conducted pursuant to the Corporation's policy to deal with the representatives of any group of its employees.

"The vital question involved is whether General Motors Corporation is willing to sign an agreement for a closed shop, recognizing the Local Union as the exclusive representative of all the employees of its Toledo Plant. This General Motors will not do.

"The strike was called in the face of the fact that, in accordance with the procedure laid down by the National Automobile Labor Board appointed by the President of the United States and election to determine accredited representatives of the workers in the Toledo Plant was to be held on Wednesday, April 24, and all arrangements had been made for that purpose. The strike will probably frustrate tomorrow's election.

"Wages at the Plant were at the highest level ever paid, on a par with or higher than wages for similar work in the Toledo district."

The company's counter-proposals were received by the union Monday evening but the strike was called without laying them before the membership. Only two conferences were held between the union committee and the plant management prior to the strike which became effective Tuesday, at 6 A.M.

William S. Knudsen, executive vice-president of General Motors, M. E. Coyle and C. E. Wetherald, Chevrolet president and vice-president respectively, Hugh Dean, in charge of Chevrolet manufacturing operations, and Alfred D. Gulliver, newly appointed manager of the Toledo plant, represented the company in the conferences.

As a result of the strike, final elections at the plant scheduled for yesterday by the Automobile Labor Board were postponed.

Conditions at the plant have been orderly. Only union members are allowed on the picket lines, although communist groups have attempted to inject themselves into the situation. Office workers including the paymaster have been barred from the plant so that workers probably will not receive their two-week checks tomorrow. Mr. Coyle and Mr. Wetherald were here yesterday to arrange for the payroll but said nothing could be done. Mr. Dean has returned to Detroit. Ten special Chevrolet police left the plant late today under permission and after search by pickets.

One of the important factors in the situation was the recent defection of a large group of workers from the employees' association to the federal union. Ernest Slater, chairman of the works council, was one who openly announced he would go over to the federal union. He was a nominee against Fred Schwake, business agent of the union, in one of the districts.

Mr. Dean said that the 2340 workers in the plant have been paid an average of 69.6 cents per hour.

Mr. Schwake, business agent of the union, left the Monday afternoon conference to confer with officials of the Willys-Overland company on wage and working conditions in that plant. He reported later that he had made "wonderful progress" at the meeting but further negotiations would await the return to the city of David R. Wilson, receiver and general manager.

In Washington, William Green, president of the A. F. of L., said that the workers acted on their own initiative. He said that "there was grave danger that the strike of workers in the Toledo plant might spread to other plants of the automotive industry."

AFL pickets parading before Chevrolet plant at Toledo following Tuesday's strike call

Camshafts threading the finishing operations in the Ford Rouge Plant

Continental Gets U.S. Order for 90 h.p., 6 cyl. Engine

The award of a contract to the Continental Motors Corp., for a 90 hp. six cylinder, radial, air-cooled engine for use in connection with the program of the Bureau of Air Commerce of the Department of Commerce to bring about the development of safer, easier-operated, low-priced aircraft for the private owner, has been announced by Eugene L. Vidal, director of Air Commerce.

The engine will be only 20 in. in diameter, and will operate on the two-stroke cycle. The department's specifications require that the weight of the engine will be not over two pounds per horsepower, including the starter and generator. This weight is believed to be lower than any aviation engine of this power now in production in the United States and compares with the weight of more than four pounds per horsepower for automobile engines.

W-O Adds Pick-Up Truck

Willys has added a 77 cab pick-up truck, the first models of which are now coming off the line. The new truck has a floor length of 57 inches, floor width of more than 40 inches and a side height of nearly 14 inches.

Seek Perkins Aid In Discrimination Cases

AFL Leader Tells Labor Secretary GM Discharged Union Workers Unfairly

WASHINGTON, April 25—Accompanied by a delegation of four employees at the Fisher Body and Chevrolet assembly plants at Janesville, Wis,, Francis J. Dillon, A. F. of L. organizer in the automotive industry, called upon Secretary of Labor Frances Perkins yesterday afternoon and asked her to intercede on behalf of 37 union men at the Janesville plants who, he charged, had been dismissed because of union affiliation. Following the conference, Miss Perkins stated that Mr. Dillon had also laid before her seven cases at Atlanta, Ga., five cases at Norwood, Ohio, 74 cases at St. Louis and one case at Flint, Mich., all involving disputes at General Motor plants. Of the cases laid before her with respect to the St. Louis plant, it was stated that 46 had been withdrawn from the Wolman Automobile Labor Board.

Miss Perkins did not say what she proposed to do in the Janesville situation, but the implication from other sources was that the case was not serious. Mr. Dillon, however, before the conference said that he had no faith in the Wolman Board and subsequent to it said that he told Miss Perkins that he had made it plain to her that "the Wolman Board is out, all washed out, and we will have nothing to do with it."

Dillon had previously said that he was going to ask that Miss Perkins intercede in the Janesville case and that unless she did so a situation like that at the Chevrolet plant at Toledo, might develop and finally spread to a general automobile strike.

The Janesville situation, according to Mr. Dillon, is the outcome of discharge by the Chevrolet Motor Co., and the Fisher Body Co., of 37 members of the Auto Workers' Union. He declared that the companies changed classification of the employees in order to let them out, doing so by reducing their rating instead of giving them the classification to which they were entitled by the seniority rule.

Washington Sees NIRA Extension Certain; Nature of Changes Obscure

WASHINGTON, April 25—The National Industrial Recovery Act will be extended, but in a greatly modified form. This is the studied view that appears to predominate now that the lengthy hearings before the Senate Committee on Finance have come to an end, despite the hazard of prophecy. And the hazard is great when consideration is given to the fact that the present Congress is more like a mass meeting than a deliberative, legislative body.

Speculation as to what the bill finally passed by Congress will provide, is idle. Certainly no definite guide is found in looking to what the Administration wants. Already it has shown that it is willing to compromise. No better proof of this is evident than the fact that Administration supporters have asked Senator Borah, of Idaho, to confer with them on the NRA Bill. The Idaho Senator's attitude toward NRA is sharply critical. He is determined to do all he can to see that the anti-trust laws are fully restored, all forms of price fixing barred and that the government clearly states it is not seeking to interfere with purely intrastate business. There is no doubt that Senator Borah's attitude, backed by a substantial group in the Senate, with a similar viewpoint prevalent in the House, has much support outside Congress.

The weight of testimony at the Senate hearings favors extension of the NIRA with modifications. Even its most ardent supporters, in effect, admitted that NRA has been weighed and found wanting in some respects. Actually this formed the crux of the nearly 20,000-word-long statement made to the committee Thursday of last week by former Administrator Hugh S. Johnson, the final witness. General Johnson's statement was an admission of errors and defense, followed by recommendations for changes. He advised some changes that unquestionably would be strongly opposed by industry as a whole, especially as to labor provisions, less work hours and increased rates of pay.

While General Johnson was pleading earnestly for NRA's extension, a group of Brookings Institute economists made public a report assailing NRA as retarding recovery. The only good thing the Brookings report had to say of NRA was that its "efforts to facilitate competition are its most creditable additions to the economic structure." NRA, said the report, "put the cart before the horse" by trying to raise purchasing power by boosting costs and prices. This blast met with a counter attack from Donald Richberg, who charged that the report was political propaganda.

The extension of the Act, of course, is dependent upon the outcome of the pending Schechter poultry case, expected to be decided by the Supreme Court before the June adjournment. The case involves the constitutionality of NRA with particular attacks made by the defending poultry interests against wage and hours provisions.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

Although the weather throughout most of the country last week was unfavorable, there was some improvement in general business. The tendency on commodity markets continued upward, and grain quotations were strengthened by unfavorable crop reports and the dust storms. Conditions in real estate have been improving during the last several weeks; and it is reported that rents are becoming firmer, while there are fewer foreclosures.

Freight Loadings Increase

Railway freight loadings during the week ended April 13 totaled 587,685 cars, which marks an increase of 42,058 cars above those during the preceding week, an increase of 7704 cars above those a year ago, and an increase of 89,503 cars above those two years ago.

Food Prices Firm

According to the Bureau of Labor Statistics, there was no change in retail food prices during the two weeks ended March 26. The current index is 21.7 per cent above the 1913 average and 12.6 per cent above that a year ago.

Life Insurance Drops in March

Sales of ordinary life insurance in the United States during the first quarter of this year were 14 per cent above those in the corresponding period last year. This increase was achieved despite the fact that sales during March alone were about 4 per cent below those in March, 1934.

Retail Sales Rise

Store chain sales during March were 4.3 per cent above those a year ago, while sales during the first quarter of this year showed an increase of 6.5 per cent. The comparison with last year is much better than the figures indicate; for Easter sales came in March last year, while this year the bulk of Easter buying occurred in April.

Lumber Production Up

New business and production at the lumber mills during the week ended April 13 were higher, with two exceptions, than any other week during this year. Production was somewhat below the level in the corresponding period last year, but new business was 22 per cent heavier.

Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended April 20 stood at 81.5, as against 81.7 the week before and 81.0 two weeks before.

Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended April 17 showed increases of $1,000,000 each in holdings of discounted bills and holdings of government securities. There was no change in holdings of bills bought in the open market. There was an increase of $58,000,000 in stocks of monetary gold and an increase of $25,000,000 in money in circulation.

Fisher Praises Bendix 100% Employment Record

The Bendix Aviation Corp.'s present record of 100 per cent employment was termed by Dr. Irving Fisher, Yale professor of economics, as one of the "most encouraging things I've seen." Dr. Fisher's remark was made during a recent interview in which he stated he has found a much more optimistic outlook through the middle west than from business and financial leaders of the east.

Allis-Chalmers Issues Own Book of Standards

Through its Book of Standards all departments of the Allis-Chalmers organization now have available the company's standards and specifications decided upon by the Engineers' Standardization Committee and the Materials and Shop Standardization Committee, according to Industrial Standardization and Commercial Standards Monthly.

The Book of Standards also contains general materials, specifications and dimensional standards checked with the latest practice as approved by the national engineering standards organizations and by the American Standards Association.

February Income Second Largest Since Sept. '30

The American public received nearly a billion dollars more from payrolls in industry, trade, services, and transportation, as well as from the sale of farm products and Government payments to agriculture, during January and February this year as compared with the first two months last year, according to A. W. Zelomek, economist of the International Statistical Bureau, Inc., New York.

The Bureau estimates consumer income at $7,037,000,000 for the first two months in 1935 as compared with $6,040,000,000 a year ago, and $4,726,000,000 for the corresponding period two years ago. This was the highest total since 1931. The February Index of Income, after seasonal adjustment, was the highest, with the exception of July, 1934, since September, 1930. The greatest percentage of increase was in income from manufacturing payrolls which were 29.8 per cent higher than a year ago.

H. T. Ewald Honored by Staff on 50th Birthday

Henry T. Ewald, pioneer Detroit advertising man and president of the Campbell-Ewald Company, was honored Saturday, April 20, by 75 senior staff members at an informal gathering in celebration of his fiftieth birthday. The meeting was held in the company's conference room in the General Motors building.

Besides a birthday cake, Mr. Ewald received a large leather-bound book in which the history of his career was recorded in photographs, cartoons, and hand-illuminated type. Among the hosts were 32 employes whose service with the company aggregates 446 years. The Campbell-Ewald Company was organized here 24 years ago.

Kelsey-Hayes Election Off Pending Court Appeal

Plant election ordered by the National Labor Relations Board at the Kelsey-Hayes Wheel Co. for Tuesday, April 23, has been postponed until the United States Court of Appeals at Cincinnati hears the company's appeal from the Labor Board's order. There is a possibility that the Kelsey-Hayes case may be disposed of by the Court's decision on the question now before it concerning elections in the Akron rubber plants.

Kelsey-Hayes takes the broad position that as manufacturer of wheels and rims it is not engaged in interstate commerce and therefore not subject to Federal regulation or more specifically to the order of the NLRB. The company holds also that there has been no showing made that an election is necessary or even desirable, pointing out that no dispute with its employes is pending and that the management has been meeting with representatives both from the United Automobile Workers Federal Labor Union and the Employes Association into which groups its 4000 workers are divided.

Ace, Boss, Mogul, Big Chief Studebaker Chassis Names

Each of the four chassis models in Studebaker's new line of trucks is to bear a distinctive name. The Ace is the designation chosen for the 1½-ton chassis which at its new low price of $565 is expected to lead the line in volume. The 2-ton chassis will be known as The Boss; the 2½-ton unit, as The Mogul; and the 3- to 4-ton unit, as The Big Chief.

W. H. Edwards, manager of the truck division of the reorganized Studebaker Corp., states that since introduction of the new line of trucks last month, sales have increased so rapidly that the first four months of this year will be the largest for four years in commercial car volume.

Federal April Output Nears 500 Unit Mark

Unfilled Orders Bank Largest in Five Years; Anticipate US Contract

With more unfilled orders on hand than at any time in five years, Federal Motor Truck Co. is making progress in expanding production on its recently introduced new models, and will probably turn out 500 units this month.

In addition to the substantially increased domestic business, Federal is enjoying good foreign demand for its products. Its export shipments last year increased 125 per cent over 1933, against an increase in all shipments of 55 per cent. The company recently completed delivery on a $1,000,000 order for 400 four-wheel drive 2½-ton trucks for the army and is looking forward to more such business, since the army is said to have insufficient equipment of this type. Moreover the huge work-relief appropriation and the administration's determination materially to expand CCC activities is expected to produce additional government business.

A substantial percentage of Federal's business is of the heavy-duty type, the ratio being roughly 35 per cent of over two-ton capacity to 65 per cent of the smaller types, which is said to be better than average for the industry. Recent demand has been running toward larger sizes.

Federal enjoyed profitable operations in the first quarter. Aside from increased sales, a factor in the better showing is the elimination of unprofitable factory sales branches. Out of 35 branches once operated by the factory, only six remain and these are in leading cities.

Commemorating its silver anniversary, the company will issue a booklet recounting its achievements as an exclusive truck builder and outlining its history which spans a quarter century. Approximately 20,000 of the booklets are to be printed for distribution among stockholders, bankers, distributors, dealers and fleet operators.

SAE Regional Meeting May Develop Hartford Section

The S.A.E. held a regional meeting in Hartford, Conn., on Friday of this week. This is the second such meeting held by the Society in that city and on the basis of the interest shown, it is anticipated that a decision will be made as to whether a Hartford or Connecticut Section should be established.

The arrangements for the meeting were made by Charles H. Chatfield, S.A.E. vice-president for Aircraft Engineering and chairman of the technical advisory committee of the United Aircraft Corp. The program included Guy E. Beardsley, Jr., Pratt & Whitney, who spoke on the Hiscock Automatic Power and Mixture Control; C. Fayette Taylor on Stresses in Aircraft Engine Parts; A. V. D. Willgoos, Pratt & Whitney, was chairman. Robert Insley, Pratt & Whitney, presided at the dinner at which Donald L. Brown, president of United Aircraft, spoke.

F. E. Zorniger

Zorniger Named Asst. Chevrolet Ad. Manager

F. E. Zorniger has been appointed assistant advertising manager of Chevrolet, with headquarters in the central office at Detroit.

Mr. Zorniger joined Chevrolet 12 years ago, serving first as a sales representative, then as sales promotion manager, city sales manager, assistant zone manager, and zone manager at such cities as Louisville, Dayton, Charleston, Knoxville, Columbus, O., and Norwood, O. Before becoming connected with the Chevrolet company, Mr. Zorniger, a native of Indiana, had been with leading motor car and tractor manufacturers.

Wood-Gas Generator for Small Cars Developed

Vice-Consul A. N. Steyne reports from Hamburg that a wood-gas generator suitable for use on small passenger cars has been developed in Germany. Development work on gas generators for use on commercial vehicles has been carried on in Europe ever since the World War, but in spite of the active aid of various governments in the form of tax concessions and purchase bonuses, their practical use has remain limited. For the new German generator it is claimed that it is no more bulky than a trunk and that it permits of engine speeds as high as with gasoline. To obviate the need of a suction fan and battery for operating the generator, the engine is started on gasoline; then for about one-and-one-quarter miles the engine is operated on gasoline and suction gas jointly, and thereafter on wood-gas alone. The system includes a special scrubbing device to remove tarry matter from the gas before it enters the engine.

Marathon Enlarging Plant

Marathon Battery Co., Wausau, Wis., manufacturer of storage batteries and allied products, is starting work on the erection of a one-story factory extension, 100 x 110 ft., made necessary by heavy orders for original equipment as well as replacements.

New N. Y. Bus Line Shows Profit in First Month

The report covering the first month's operations of the new Madison Avenue bus line in New York City, which replaced street service on Feb. 1, 1935, points to the conclusion that even in mass transportation in big cities, long held to be a field in which the trolley would maintain its position, the days of the street car are numbered.

The new bus line carried 1,815,573 passengers in February at a five-cent fare, compared with 972,998 for the street cars in the same month last year. In addition, the buses sold 58,357 two-cent transfers against 25,709 for the trolleys in February, 1934. Bus revenue for the month was $91,946, against $49,164 for the cars last year. Moreover, the buses operated at a profit of $4,985 for the month as against a loss for the trolleys in the same month last year.

On a per route mile basis, the buses took in 54.65 cents and paid out 46.58 cents, while last year in February the trolley cars took in 46.5 cents and paid out 50.94 cents.

With the exception of the Lexington Avenue car line, which lost some traffic, the additional traffic on the buses does not appear to have been at the expense of other transportation lines on adjacent streets.

French Race Car Subsidy Seen as Competition Boon

The Contest Board of the AAA looks upon the French subsidy of builders and drivers of racing cars as an added impetus to greater international rivalry in the historic Indianapolis 500 mile classic run every Memorial Day in this country for the $100,000 prize. Announcement of the French subsidy was made in the Feb. 9 issue of *Automotive Industries*.

Funds to finance French builders and drivers entering the American classic are being raised through public subscription with President Lebrun working in conjunction with officials of the Automobile Club of France. Captain Eddie Rickenbacker, chairman of the Board, has expressed the opinion that the French move will spread to other countries of Europe and increase eventually the number of foreign contestants in the Indianapolis race.

Calgary Hearing to Open Canadian Motor Inquiry

The Canadian Tariff Board at Ottawa, Ont., will begin the investigation of the automobile industry by visiting car and parts plants, probably within the next week or two. The hearing of evidence will open in Calgary when the Board is there in connection with the gasoline inquiry. The Board had planned going to Calgary early in May but requests have come from persons submitting evidence in that city to have the hearing postponed, and the Board will comply with this request. While in the west, the Board will go to Vancouver, B. C., where hearings will be conducted in connection with both inquiries. Later the Board will return to Ottawa and conclude its hearings in that city.

Jan.-March Earning Statements

Car Companies	1935	1934
3 companies reported	+ $2,476,764	+ $3,346,002
General Motors	+ 31,510,371	+ 29,319,523
Caterpillar Tractor	+ 1,084,777	+ 787,477
Hupp	— 4,398,445	— 1,777,588
Total—6 companies	+ 30,673,467	+ 31,675,414
Parts Companies	**1935**	**1934**
9 companies reported	+ $4,972,084	+ 2,808,857
Thompson Products Corp.	+ 150,083	+ 147,941
Bohn Aluminum & Brass	+ 554,613	+ 649,953
Noblitt-Sparks	+ 108,630	+ 49,790
Allis-Chalmers	— 22,242	— 677,153
Campbell-Wyant & Cannon	+ 133,000	+ 81,843
Ex-Cell-O	+ 93,112	+ 136,076
Laher Auto Springs	+ 3,418	— 4,878
Nat'l Automatic Fibres	+ 263,380	+ 147,404
Stewart-Warner	+ 496,063	+ 167,495
Briggs & Stratton	+ 375,075	+ 210,313
Total—19 companies	+ 7,127,716	+ 3,717,641

Chevrolet Adds Carryall Model to Line; $680 List

Chevrolet has added to its line a Carryall Suburban model which can be used interchangeably for hauling merchandise and for carrying up to eight persons.

The new body type is mounted on a Chevrolet chassis of 112-in. wheelbase and equipped with 5.50/17-in. tires. Its list price is $680. The body provides a loading space 75 in. long, 52 in. wide, and 51 in. high. Loading is through the rear, which has a horizontally divided closure, the lower half dropping to serve as a tail gate, while the upper half swings upward, its weight being carried by a spring-balanced safety support.

Front and rear seats accommodate three persons each, the middle seat two. Entrance is through the right front door, past a tilting, coach-type single seat and an aisle alongside the middle seat. The middle and rear seats can be readily removed when the car is to be used to carry goods. Quick-acting hold-down bolts fasten the seats to metal plates set flush in the floor.

In appearance the car resembles a passenger car of the station-wagon type, with body panels having rounded contours at the sides and rear. Various color combinations are available. The three large windows on each side are fitted with ventilation controls, and the two rear windows are mounted in rounded frames in the upper half of the back closure.

Olds, Pontiac Offering Free Inspection Service

With almost a thousand dealers taking part and with more than 200,000 motorists personally invited to take advantage of the plan, Oldsmobile has just completed a national drive for inspection of those automobile features which are most important to the safety of drivers. The recently conducted campaign, which is to be run twice a year for five years, was directed at keeping all cars on the road in safe driving condition.

With the same objective, another GM division—Pontiac—is getting under way with a similar campaign.

Free inspection of the most important safety features from the standpoint of operation of the car was offered by Olds dealers to every motorist in the cities where the inspections were held. Examination was made, without cost, of brakes, headlights, steering, tires, horns and windshield wipers, each one of which should function perfectly at all times to insure the highest degree of safety.

Employment Gains 20% at Pressure Castings Co.

Employment at the Pressure Castings plant has gained approximately 20 per cent within the last two weeks due to an increased volume of business, company officials have announced. Present orders are sufficient to keep the company operating for at least three months. The new orders recently received consist mainly of die castings used on filling stations and are said to have come principally from the Akron area.

George Ralls, who recently resigned as director of sales of the parts division of the Chrysler Corp., is now president of the company. Mr. Ralls has been identified with the parts manufacturing industry for many years, serving as president of the Gabriel Co. prior to his association with Chrysler.

GM First Quarter Profit Largest in Five Years

Net earnings of General Motors for the first quarter of this year are the largest of any corresponding period in the past five years. For the January-March quarter of the current year, earnings are reported as $31,510,371 which compares with $29,319,523 for the same period of 1934 and $44,968,587 in 1930.

Net sales of General Motors, excluding inter-divisional transactions, for the first quarter ended March 31, 1935, amounted to $246,325,357, compared with $205,124,080 for the first quarter of last year.

Chevrolet Zone Managers Reassigned by Holler

The appointment of zone managers in five of Chevrolet's important sales centers in the United States has been announced by W. E. Holler, vice-president and general sales manager. The appointments, which are effective immediately, are:

Norwood (O.) zone—D. C. Corbin, previously zone manager at Omaha, to succeed F. E. Zorniger. Omaha zone—I. X. Sarvis, previously zone manager at Fargo, N. D. Fargo zone—D. H. Smith, previously assistant zone manager at Janesville, Wisc. Oklahoma City zone—R. C. Pittman, previously zone manager at Denver, to succeed W. C. Jones, transferred to Los Angeles as city sales manager. Denver zone—A. W. Famular, for the past year manager of the Dealer Finance and Business Management department of the company in Detroit.

Louis K. Manley

For the past four years manager of branches for Studebaker, who has been named general sales manager of the reorganized corporation by Paul G. Hoffman, president

Proposes NADA-PAA Peace Conference

A proposal that representatives of the National Automobile Dealers Association and the Pennsylvania Automotive Association meet in Baltimore for the discussion and conciliation of differences has been made by John E. Raine, general manager of the Maryland Automobile Trade Association.

Alarmed at the publicity given the controversy that has developed between Pennsylvania and the national organization, Mr. Raine urges the necessity for a united front at this time when "the present and near future of the entire dealer structure is critical." Both organizations, he says, are trying to approach the same goal but by different routes.

William H. Goldstine

William H. Goldstine, former superintendent of Buick and later superintendent of the Nash foundry, died Sunday at his home in Flint. Mr. Goldstine was 71 years old and death followed a protracted illness.

From April, 1908, until August, 1919, Mr. Goldstine was superintendent of Buick. He went to Kenosha directly from the Buick company and took over supervision of the Nash foundry continuing until his retirement in 1925. Mr. Goldstine is survived by his wife, the former Bertha Blackmer, and two sons, Harry T. and William F. Goldstine, and two grandchildren.

Studebaker April Output Leading March By 18%

Studebaker production for the first two weeks in April is 18 per cent ahead of the same period last year and the production schedule for all of April calls for a 14 per cent increase over March. This was revealed by figures recently released, which indicated that 5,800 passenger cars and trucks will be turned out in the South Bend plants during April. Thus far this month 3,225 units have rolled off the assembly lines. During March a total of 5,210 automobiles and trucks were sold.

Chevrolet Names Gulliver Toledo Plant Manager

Alfred G. Gulliver has been appointed general manager of the Toledo plant of the Chevrolet Motor Co., where a strike was called this week, succeeding Bert Conway, who resigned. Mr. Gulliver has 27 years' experience in the industry, having been with Chevrolet since 1915, and prior to that with Buick.

Ainsworth Accepts Labor Committee Appointment

Cyril Ainsworth, assistant secretary of the American Standards Association and brother of Marcus Ainsworth, Chilton staff statistician, has acepted Secretary Perkins' invitation to membership on a special advisory committee of the United States Department of Labor which will consider matters pertaining to industrial safety and health.

Final ALB Returns

Final returns on nominating elections held by the Automobile Labor Board in 63 automotive plants showed that 68.6 per cent of the 163,150 voting workers had cast unaffiliated ballots. Employees associations polled 21,774 votes or 13.3 per cent. The American Federation of Labor was third with 14,057 or 8.6 per cent, while the Associated Automobile Workers of America followed with 6083 or 3.7 per cent. This completes the nominating elections of the board appointed by the President more than a year ago to set up proportional representation for collective bargaining. Ballots were cast by 85 per cent of those eligible to vote.

No Agreement on Hupp

Up to Thursday noon, no agreement had been reached by opposing factions in the Hupp Motor Car Corp. dispute. Archie M. Andrews so far had failed to agree on the coalition directorate which had been proposed in conferences before Federal Judge Edward J. Moinet. Conferences were to be resumed in the afternoon.

Delisting hearings on Hupp stock originally scheduled for Thursday have been postponed to May 2 because of the presence of certain witnesses and counsel being required at court hearings in Detroit.

Anderson Heads Hayes

A. A. Anderson, formerly secretary and treasurer of Hayes Body Corp., has been elected president, succeeding W. W. Hoagland, who becomes chairman of the board. E. J. Connolly, former vice-president, has been made vice-president and general manager. O. W. Birnie becomes secretary and assistant treasurer and McKee Robison is made assistant secretary. Directors were reelected at annual meeting.

Lott Succeeds Rands As Motor Products Head

A. L. Lott, vice-president of Motor Products Corp., has been elected president, succeeding C. W. Rands, who resigned last week at the annual meeting. E. M. Fitzgerald has been elected a director to succeed Mr. Rands.

Budd Gets Autocar Order

The Edward G. Budd Mfg. Co. has received an order from the Autocar Co., Ardmore, Pa., for the production of dies and stampings for the cabs of the new streamlined Autocars. Production will be undertaken immediately.

SAE Summer Meeting Tentative Program

The Society of Automotive Engineers announces the following tentative program of technical sessions for the Summer Meeting to be held this year at White Sulphur Springs, Va., beginning Sunday, June 16, and continuing until the following Friday.

Sunday, June 16

Business Session
General Session
A real opener for the 30th Anniversary Celebration

Monday, June 17

Transportation and Maintenance
Motor Transportation: What's Its Destination?
Aircraft Engines
Engine Cooling and Cold Weather Starting
Foreign Aircraft Engine Developments
Passenger Car
All about Stresses in Bearing Metals

Tuesday, June 18

Truck, Bus and Railcar
Diesels Applied to Trucks and Buses
Aircraft
Flying Boat Operation
Results on Foreign Lines

Wednesday, June 19

Passenger Car
Looking Ahead in Design
Diesel
Fuel Systems and Performance
Operation of Diesel Powered Vehicles
Tractor
The Tractor Industry

Thursday, June 20

Passenger Car Body
Fundamentals in Design
Fuels and Lubricants
Symposium on Fuel Volatility
General Session
Something you all will want to hear

Friday, June 21

Passenger Car
Suspensions? Yes, and
Transmissions, too!
Fuels and Lubricants
What's New in E. P. Lubricants

Eastman Bill Truck Rate Regulations Scored by AMA in Letter to Huddleston

The Eastman Motor Carrier bill, passed by the Senate last week, contains provisions which may be used to impair and restrict the freedom, flexibility and economy of interstate motor truck transportation and which will impose regulation upon motor truck operators more stringent and burdensome than the existing laws for the regulation of railroads, the Automobile Manufacturers Association has informed Representative George Huddleston, chairman of the motor carrier sub-committee of the House Interstate and Foreign Commerce Committee, in a letter dated April 17 and signed by Alfred Reeves, AMA vice-president.

Speaking as shippers who paid approximately $90,000,000 in freight bills last year, exclusive of shipments of bulk raw materials and fuel into the plants, the AMA centers its attack on the rate regulating provisions of the bill as applied to truck transportation. The letter also says that conditions facing bus and truck operators differ materially and urges that a separate regulatory measure be enacted covering bus carriers. As to trucks, the letter asks that the conditions pertaining to truck transportation be reviewed carefully and that regulation of trucks be restricted to simple and inexpensive requirements which can be met by all truck operators for hire engaged in interstate commerce without penalizing the shipping public.

Bantam Ball Shipments Up 50%

The Bantam Ball Bearing Company, South Bend, Ind., reports an increase in shipments for the first quarter of 1935 of approximately 50 per cent over the first quarter of 1934. This represents an increase of over 400 per cent for the corresponding period of 1933.

Frost Aide to Vesper

Jack Frost has been named assistant to the president of the National Automobile Dealers Association by F. W. A. Vesper, president of the organization.

Die set for automotive frames torch-cut and welded from steel plate by Danly Machine Specialties, Inc., Chicago. It is 24" wide and 192" long—16 feet overall—weighs 10,900 pounds.
The steel bosses are screwed and dowelled in place and carry bronze bushings 4" I.D. and 10¼" long. Guide Posts are 4" diameter x 45" long, hardened and ground.

Bigger Motor Orders Boost Steel Output

May Requirements Reflect Optimistic Outlook for Healthy Spring Business

Specifications and shipping orders received in the last few days by rolling and finishing mills indicate that some automotive consumers have so reduced their steel reserve that they are now in need of material to take care of their May requirements. Backlogs of sheet mills, especially of those specializing in automobile sheets, that earlier in the month were melting fast, are now being added to almost daily. Interruption of production in a Michigan mill as the result of a labor dispute prompted some buyers not to figure any longer quite as close on deliveries, as they had been in the habit of doing.

Chicago district mills were reported to be operating at about 6 per cent higher rate this week than in the preceding one, due to better specifications from automotive consumers. Irregularity in the operating rates of the different steel districts is in part attributed to delay in the adjustment of intrastate freight rates to the surcharges that went into effect in interstate commerce last week, some business having gone to mills in the buyer's home state, because of the saving in freight.

The latest report of the National Association of Flat Rolled Steel Manufacturers shows that sheet sales in March by its members were 10,000 tons over those in February, shipments in March aggregating 233,446 tons or 76.1 per cent of capacity. Fresh sales in March aggregated 193,057 tons or 62.9 per cent of capacity. The American Iron and Steel Institute's figure for this week of the operating rate is 44.6 per cent of theoretical ingot capacity, a gain of about 1½ per cent over the preceding week. Announcement of the letting of contracts by one of the leading interest's subsidiaries for construction of a continuous sheet strip mill, to roll 72-inch wide material and of the letting of structural steel awards for the housing of a similar mill being erected by one of the prominent "independents" came as reminders to the steel market of the impressive increase in capacity for the production of automotive flat steels that overhangs the industry and that can not be ignored as one of the vital factors in an appraisal of the long range market outlook.

Pig Iron—Talk of higher prices in the third quarter continues. In the iron ore market there are also predictions of a rise. Automotive foundries, however, have not altered their buying policy of taking on tonnages commensurate with their melts rather than to stock iron by way of price protection.

Copper—Domestic demand continues to make a fair showing. The statistical picture of the market is also brighter here and there. Benefits to be derived from the international agreement are not looked for before mid-summer. Prices are entirely unchanged.

Tin—Due to London and Singapore trading being suspended on Monday because of the Easter holidays, the New York market was largely a nominal affair, spot Straits tin being quoted at 50¾ cents at the beginning of the week.

Lead—Another advance of $1 per ton was announced by the leading marketers on Monday, demand being very good.

Zinc—Higher ore prices caused the market to stiffen, the New York price being 4.45 cents, $4 per ton higher than a month ago.

Hudson Smashes 35 AAA Records for Stock Cars

Thirty-five AAA records were smashed by a standard stock Hudson sedan at Muroc Dry Lake, California, last week. Thirty-two Class C displacement records went by the board, and unlimited displacement records for 1,000 miles, 2,000 kilometers and 12 hours also fell.

The records were made by Wilbur Shaw, Babe Stapp and Al Gordon.

A tabulation of the new and old records follows:

	Old	New
1 Kilo	88.2	92.8
1 Mile	88.2	92.7
5 Kilos	88.1	93.03
5 Miles	88.05	93.02
10 Kilos	80.8	88.03
10 Miles		88.03
25 Kilos	0	88.1
25 Miles	81.1	88.2
50 Kilos	81.18	88.2
50 Miles	81.1	88.3
75 Kilos	0	88.3
75 Miles	80.9	88.3
200 Kilos	80.7	87.0
200 Miles	79.2	87.4
250 Kilos	0	87.2
250 Miles	78.7	86.5
300 Kilos	0	87.4
300 Miles	78.3	86.7
400 Kilos	0	86.5
400 Miles	77.2	86.5
500 Miles	76.2	86.3
1000 Kilos	76.1	86.2
1000 Miles	76.2	85.8
1000 Miles—Unlimited		
Class C	81.18	85.8
2000 Kilos	76.0	83.6
2000 Kilos—Unlimited		
Class C	82.45	83.6
3000 Kilos	75.2	84.5
3 Hrs.	78.8	86.6
6 Hrs.	76.1	86.3
12 Hrs.	76.0	85.4
12 Hrs.—Unlimited		
Class C	80.9	85.4

Greene Represents British Makers, Traders in Canada

The Motor Manufacturers and Traders Society in Great Britain has announced the appointment of K. A. Greene, of Ottawa, Ont., as their correspondent in Canada. It is stated that he will advise best methods of approach to official bodies in Canada regarding matters which affect the use of British motor products in the Dominion.

CALENDAR OF COMING EVENTS

SHOWS

Machine Tool Show—Cleveland..Sept. 11-21
New York Automobile Show, New York, Nov. 2-9
Buffalo Automobile Show.....Nov. 9-16
Automotive Service Industries Show—Atlantic City .....Dec. 9-13

CONVENTIONS AND MEETINGS

U. S. Chamber of Commerce Annual Meeting, Washington, D. C. Apr. 29-May 2
American Society of Mechanical Engineers (National Oil and Gas Power Meeting), Tulsa, Okla..May 8-11
National Battery Manufacturers Assoc. Spring Convention, Cleveland, May 22-23
Automotive Trade Assoc. Managers Mid-Year Meeting, Washington, D. C. .....May 22-24
Automotive Engine Rebuilders Assoc. —Indianapolis .....May 27-30
S.A.E. Summer Meeting—White Sulphur Springs, Va. .....June 16-20
American Society for Testing Metals, Detroit .....June 24-28
National Assoc. Sales Finance Cos.—White Sulphur Springs.....Sept. 26-28
American Society for Metals, Annual Meeting—Chicago .....Sept. 30-Oct. 4
National Safety Council, Louisville, Ky. .....October 14-18
American Gas Association — Atlantic City .....Oct. 14-18
American Petroleum Institute — Los Angeles .....Nov. 11-14
National Industrial Traffic League—Chicago .....Nov. 20-21

RACES

Race—Indianapolis Race, Indianapolis, May 30

JUST AMONG OURSELVES

Foreign Buyers Mystified, Too

FOREIGN buyers of our motor cars are as mystified by the industry's list pricing practices as are purchasers of automobiles in this country. At least so it would appear from the statement issued last week by the export managers of the AMA which explained that list prices "do not include the prices of many items of equipment which are standard for the U. S. trade nor of other than standard accessories which are ordinarily required by American and foreign buyers."

The spread between delivered and advertised list prices on cars in this country may be both reasonable and explainable, but it is often so large that it is not credible. Attracted by an advertisement of a car in one price class, the prospect too often finds that when he tries to buy that car from a dealer it is in an altogether different price class.

As has been pointed out previously in these columns, it should be possible for manufacturers to agree as to what constitutes an automobile so that it would not be necessary to charge extra for "standard" items of equipment such as bumpers and spare tire. The cost of unloading, conditioning and delivering a car is relatively uniform the country over for a particular make. This leaves only freight as a variable. There does not appear to be any sound reason why it should not be the *only* variable. In other words, the advertised list price should include the price of the "many items of equipment which are standard for the U. S. trade," and the costs of conditioning, delivering and advertising.

* * *

Blind Spots Bigger In 1935 Models

THE trend of automobile styling in recent years has steadily been restricting the view that the driver has of the road. In many 1935 models, the blind areas have been markedly increased by more sharply angled windshields, modifications in hood and fender design and, to a lesser extent, wider pillars between front and rear doors. Whether changes of this kind have already increased the size of blind spots beyond the maximum desirable is, of course, a matter of opinion. But sporadic criticism of this year's car on this score indicates that in developing 1936 models more consideration should be given to balancing the dictates of style against the requirements of the driver.

* * *

Post Office Gets Its Man

THE Post Office rather prides itself on delivering letters addressed in odd fashion to the persons of note for whom the missives are intended. Recently it scored again. A letter addressed to High Speed Diesel, Nyack, New York City, N. Y., was delivered to P. M. Heldt at the AUTOMOTIVE INDUSTRIES' office in Philadelphia. Nyack is P. M.'s home town and that is the publication address his famous books on automotive engineering carry.

Understanding Breeds Peace

THE brief experience automobile manufacturers have had with collective bargaining has emphasized that misunderstanding is the root of controversy. As a result of this experience, it is safe to say that car makers now are striving harder than ever before to gain an understanding of their employees' viewpoint. By so doing, there is no doubt that they are uncovering and healing many sores which, if allowed to fester, would grow into real issues.

However, as many executives know, this meets the problem only partially. It is equally important for the employees to understand the viewpoint of the management and the basic reasons therefor. If management does not give them understanding on this score, there is no place for them to get the facts.

What we have in mind is not a subtle campaign of propaganda intended to make the worker more pliable by pulling the wool over his eyes. On the contrary, if the effort is to prove really helpful, it must be entirely devoid of hypocrisy. It must be based on a sincere desire to give the worker a real understanding of the practical economics of automotive manufacturing. Probably employees will view the move with some suspicion at first, but it should be possible to overcome their doubts by persistent frankness and truthfulness.

Some will say that it can't be done without revealing data that have always been held confidential. This may be doubted. Many business secrets are secrets only because they have always been secrets. Airing them would do no one any harm; in fact, it might do a lot of good.

The Editors

Need for Flexibility o
Makers in Brief on P

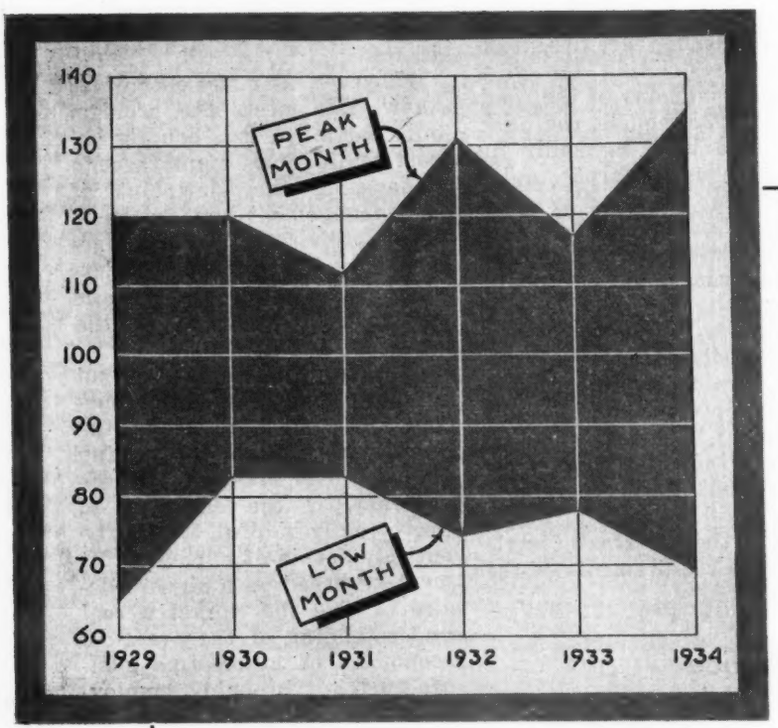
EXPRESSING vigorous opposition to the Bill (S.2445) now before Congress revising and extending the National Industrial Recovery Act, the Automobile Manufacturers Association in a brief filed last week with the Senate Committee declared that the proposed legislation departs almost as far in many respects from the original NIRA as it does from traditional American principles and that it thrusts upon the Government new and extensive responsibilities amounting virtually to a dictatorship over all business activities.

Summarizing the car makers' ideas as to what the new legislation should provide, the brief said that any extension of the law should provide a guarantee of collective bargaining with assurance of complete freedom of choice of representation, eliminating interference or coercion by employers, labor organizations or others; should continue the present provision for a basic minimum wage and the present provision for maximum hours, which permits averaging over a period sufficient to guarantee that flexibility in operation which is essential to seasonal industries. The AMA also considers it essential that the law continue to recognize the necessity that an employer have the right to employ and discharge employees on the basis of individual merit without regard to membership or non-membership in any organization.

Although the brief criticizes many of the detail provisions of the Bill which extend the Government's powers, the major attack is directed at the revisions governing hours, wages and collective bargaining. The proposed changes in the hour and wage provisions, the brief emphasizes, would force higher prices to consumers, thereby curtailing demand and employment, and would definitely limit the ability of the employer to provide his workers with an adequate annual wage despite high hourly rates.

The hours provision in the new Bill reads "the maximum hours provided for in any code shall not be less than .. hours, nor more than .. hours; except that when it is found necessary, overtime work in excess of the prescribed maximum, to be paid for at the rate of time and one-half, may be provided for in such code." After pointing out that the fact that the limits on hours are not specified makes it difficult to discuss this section, the brief says that it is doubtful that Congress can define such limits for a wide variety of industry unless a very wide latitude is allowed.

Any rigid limitation of hours would have disastrous effects on seasonal industries, the brief emphasizes. In the



Under a code limitation of 40 hr. per week averaged over the year with a maximum of 48 hr. in any one week, the spread between automobile plant employment in the high and low months in 1934 was the largest in the last six years. More rigid limits on hours would increase the spread in the future due to the larger number of temporary workers needed during the peak periods.

The two curves show the employment in the low and high months as a percentage of average employment in each year.

Abstract of brief submitted by the Automobile Manufacturers Association on the proposed legislation extending and modifying the National Industrial Recovery Act.

# of Hours Stressed by Car
Proposed New Recovery Bill

Hold workers should be protected from coercion by anyone and from being required to join a labor organization to hold their jobs

case of the automobile industry, sales are concentrated very largely in the spring months and, since the product cannot be stored, production must be keyed closely to demand. Despite the industry's efforts to iron out its seasonal variations it will continue to suffer from peaks of demand and production.

The industry recognizes that there is a limit to the hours a man should work in one week and, on the other hand, there is a limit beyond which it is inadvisable from a social standpoint, and inefficient from an operating standpoint, to add temporary workmen to the payrolls for short duration during the peak periods.

From a social standpoint, a large proportion of the automobile manufacturing industry is located in communities affording relatively few opportunities for employment other than those provided by the automobile and allied industries and by business primarily dependent upon them. Since the typical automobile producer is situated in such a community, the employment during a short period of a large number of temporary workmen would place an excessive drain upon the relief resources of that community during the months when they were out of work. It also causes difficulties by creating temporary shortages of certain classes of highly skilled labor upon whose output the steady employment of the mass of production workers is dependent.

Any rigid limitation of hours will impose excessive costs upon the consumer without commensurate benefit, and will create excessive social burdens upon automobile communities. It will aggravate greatly irregularity of employment in the automobile industry by requiring the addition of a larger number of workers who could be employed for only a few months in each year. This would increase the fluctuation between the lowest and highest number of employed during the year.

Experience under the code, the car makers say, has demonstrated this. In 1934 the industry operated under a code restriction to an annual average of 40 hours per week with a provision permitting up to 48 hours during peak periods. Despite this limited flexibility, the variation in employment between the lowest and highest months was the greatest in the past six years, exceeding even the year 1929 when the collapse of the boom caused a rapid decline in the late months of the year. The high and low points of employment in each year, and the spread between them were as follows in terms of percentage of the average number of employees as 100:

	1929	1930	1931	1932	1933	1934
Peak month ..	120	120	112	131	117	135
Low month ...	65	83	83	74	78	69
Spread	55	37	29	57	39	66

If the code had provided a maximum of 40 hours with no elastic provision the number of temporary employees hired for the peak requirements would have been considerably greater.

The effect of this provision upon the worker must be given serious consideration. For example—although the Automobile Manufacturing Code permits weekly hours to be averaged over the year with the requirement of an annual average of 40 hours per week, but permitting 48 hours in any one week, nevertheless in its first year of operation under the Code, its employees averaged only 32 hours work per week for the year.

Under any requirement that an industry do not exceed a fixed number of hours per week, employees will actually secure an average work week much below that figure. For example—a requirement that no employee in this industry be permitted to work more than 40 hours per week would result in an average of about 30 hours or less for each employee. This is another way of saying that if employees cannot expand their hours when work is available, they cannot make up for time lost due to absences, interruptions of production and seasonal declines in activity. A further result is that employees are prevented from earning a total annual income sufficient to maintain a satisfactory standard of living in spite of high hourly earnings received while working.

As a result of regularization studies, the car makers are convinced that the only feasible way to limit hours of employment is on the basis of an annual average rather than a rigid weekly limit. Thus a fixed limit of 40 hours per week in the automobile industry would be disastrous to industry, worker and consumer, while 40 hours per week averaged over the year allows necessary flexibility to the industry, permits the workers to earn an adequate annual wage, avoids the social burdens created by the addition of large numbers of temporary employees and avoids burdening the consumer with unjustified costs.

While the provision for paying time and a half for overtime may give the appearance of flexibility, in *actual practice*, the brief declares, it will operate

as a fixed maximum. In order to keep production costs down, of necessity, the manufacturers will avoid overtime during the peak season and hire temporary employees instead. The financial condition of most producers will force them to follow this course. Of the seventeen companies whose published income statements are available since 1929, only three had any net earnings. Even the three who made profits had a profit margin which was very low as compared with previous years. In the case of one of these, the earnings were merely nominal. The other fourteen companies failed to make any profit.

It is certain also, the car makers contend, that any material use of overtime would add measurably to the sales price of the product. The success of this industry in increasing sales, output and employment, has been based entirely upon the policy of the lowering of the cost of the product. Experience of the industry clearly shows that even very slight increases in cost and price result in lowered sales and consequently in employment. The automobile industry's life depends upon flexibility in working hours without penalties.

Turning to collective bargaining, the AMA regards the change in the language of Section 7a as a blow at the merit clause. The present law requires that all codes contain "the following conditions." The new Bill requires every code to contain "the following statement of rights of employees . . ." The brief declares that the purpose of this change is clear. It would emphasize that Section 7a is to deal with the rights of employees only and would give the NRA a definite ground on which to refuse to approve inclusion of the merit clause in any code.

This change also serves to aggravate the inadequacy of Section 7a, the manufacturers believe, as a declaration of labor's rights, pointing out that the original language was construed by labor agitators as a mandate to take advantage of the country's emergency, and by misinterpreting its meaning to workers, to force unionization upon unwilling workers and their employers. "This error in the original act should not be repeated. This declaration of labor's rights should be made complete by amendment to forbid coercion of employees from any source. During the past two years coercion and intimidation of workers in a great variety of forms has been constantly practised by professional union organizers."

Attacking the closed shop, the brief stresses that man's right to work should not depend upon his membership or non-membership in any organization. It is wrong to require as a condition of employment that a man be required to join any labor organization, and pay tribute to its professional exploiters as the price of a job. Revision of Section 7a to give effect to this viewpoint is urged.

The AMA brief also takes exception to many detailed provisions of the Bill. It says that the section empowering the administration to require records and reports "may very well end all right of privacy of the business man."

Giving the President the right to cancel or modify codes and orders is opposed on the ground that it gives one party to a contract the right to change its terms at will. It is urged that if this power is necessary for flexibility, it should be balanced by giving industry the right to withdraw from a code without prejudice. The provision empowering the President to establish insignia and labels and to require that Federal agencies buy from persons complying with codes and agreements, is attacked as legalizing the boycott. No feature of NRA has been more widely or justly criticized, the brief declares. "The law provides a wide variety of penalties for those who violate it. There is no need to place in the hands of those who will administer it, a power so great and so inconsistent with all American tradition."

The section conferring on any agency used by the President the broad powers conferred in Sections 9 and 10 of the Federal Trade Commissions Act, is described as giving "an unnumbered group of minor Government officials of varying talents and capacities, powers of very broad scope, susceptible of great abuse."

Making the findings of NRA that wages and hours provisions have been violated prima facie evidence in a suit brought by an employee within six months, absolving the petitioner from liability for costs and allowing him attorney fees if he wins, also is opposed. "The inducement which these sections offer to dissatisfied employees, union business agents and shyster lawyers to promote complaints on the chance of profit, is readily apparent."

The section providing for minimum wages classified according to experience and skill, the brief says, cannot be justified on the ground which supported a basic minimum wage, namely, that social considerations justified putting a floor under wages to prevent unfair competition by sweating underpaid labor. It is described as a concession to the American Federation of Labor, which has demanded from the beginning that NRA impose its arbitrary union wage scale upon all industry, regardless of economic considerations and whether an industry could stand it or the consumer afford it. It needs little imagination to picture the tug-of-war that will result on every code before the classified minimum wage scale for that industry is determined. It will make this scale the subject of political instead of economic considerations, the result of compromise rather than practical determination. It is inconceivable that any individual or group in the NRA organization can determine soundly a classified wage scale for any one of the vast number of industries to be codified. The wisdom and the propriety of any governmental agency attempting such a task is seriously questioned.

THE CONCLUSION IS INESCAPABLE, therefore, that S. 2445 constitutes proposed legislation of a far-reaching and drastic character which departs almost as far in many respects from the original National Industrial Recovery Act as it does from traditional American principles. It thrusts upon the Government new and extensive responsibilities amounting virtually to dictatorship over all business activities. The Automobile Manufacturers Association earnestly opposes its passage.

Cap Screws With Undercut Shank

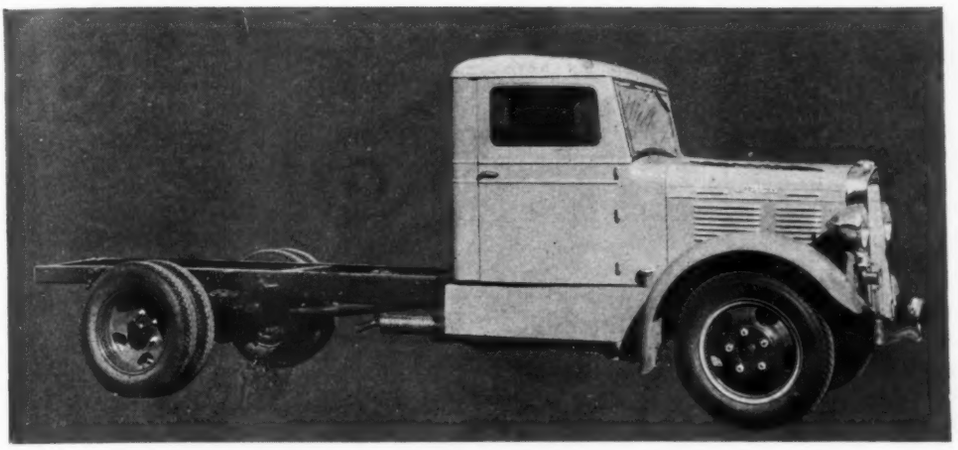
A German manufacturer of bolts and screws at the recent Berlin automobile show exhibited cap screws with the unthreaded portion reduced in diameter to the bottom diameter of the threaded portion to increase the endurance limit of the screws (their resistance to "fatigue"). Screws of this kind are not unknown in this country and are used, for instance, for connecting-rod caps by a number of manufacturers, but we do not believe they are a stock product of any manufacturer of bolts and nuts. If they were, perhaps their use for highly stressed dynamic parts would become more general.

Other new products shown by the same firm were heat-treated screws of aluminum alloy and screws with cylindrical heads with internal hexagon for the wrench.

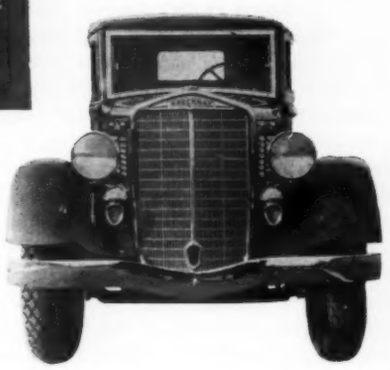
Murphy Diesel Engine—Correction

Murphy Diesel Co., Ltd. calls our attention to the fact that, contrary to a statement in our description of the Murphy engine in *Automotive Industries* of April 13, the cylinder head of the engine is in a single casting.

Front End Standardization Features New Brockway Trucks



Front and side views of one of the new Brockway trucks. New features relate principally to cab design and front-end styling



INCREASED standardization of front-end construction is the feature of 10 new truck models recently announced by Brockway Motor Co., Inc., Cortland, N. Y. Such parts as fenders, running boards, gas tanks, hood, radiator shell, headlights, bumper and cab, in fact all parts which do not affect the actual load-carrying and operating ability of the truck, have been standardized for the whole line, which not only makes for unified, characteristic appearance but results in production economies. The new models have a gross-weight range of 10,500 to 18,500 lb., as compared with six models last year. The principal specifications of the various models are given in the table herewith.

All models are equipped with hydraulic brakes, and axles, springs and frames are heavier than in corresponding last year's models. Powerplants have been moved farther forward. A wide range of wheelbases is being offered, Models 78, 87 90 X and 96 are being each furnished in wheelbase lengths of 126, 138, 144, 150, 164, 170 and 176 in., while the heavier models are also furnished in 182, 188, 200 and 206-in. wheelbases.

The standard cab, which is built in the Brockway body plant, is of "streamline" design with integral cowl, one-piece pressed-steel roof, full ventilating windshield with cowl ventilator, and safety glass throughout. Seats are of a new adjustable design. There is a storage shelf above the windshield which is illuminated by a dome light. Space for a kit of tools is provided in the corner of the cab, while the hydraulic jack is stowed away under the seat. The cab is weatherproofed and all of its metal parts, as well as metal accessories, are chromium-plated.

The engines furnished in this new line of Brockways are all L-head type Continentals ranging from 71 to 90 hp. Oil-bath air cleaners are standard equipment, and H-W oil filtrators are furnished on all models from 96 up.

Each model has a Timken heavy-duty full-floating rear axle with drive by spiral bevel gears. Springs are heavier than on earlier corresponding models. Radius rods of tubular section are furnished on Models 130 and up. Single dry-plate clutches are standard throughout the line, and the transmissions are of the four-speed type, except on the 150 X-5, which comes regularly with a five-speed transmission. Spicer needle-bearing universals and propeller shafts are standard on all models.

New Brockway Truck Line

Model	Gross Rating Lb.	Std. Wheelbase In.	Engine Dsplmt. Cu. In.	Standard Tire Size In.	Chassis Weight Lb.
78	10500	138	209	6.00/20	3800-4200
87	12000	144	248	6.50/20	4000-4300
90 X	14000	150	248	7.00/20	4200-4500
96	14000	156	288	7.00/20	4575-5000
110	16000	156	288	7.50/20	5100-5650
125 X	16000	164	318	7.50/20	5100-5650
130	18500	164	288	8.25/20	5750-6400
145	18500	176	318	8.25/20	5750-6400
150 X-4	18500	176	360	8.25/20	5750-6400
150 X-5	18500	176	360	8.25/20	5770-6450

The Menasco C6S "Buccaneer"

A 544 Cu. In. Inverted In-Line Air-cooled Aircraft Engine

by W. A. Hite

Menasco C6S "Buccaneer" aircraft engine with centrifugal supercharger in foreground.

AT the National Air Races held at Cleveland last September a Menasco C6S engine, mounted in a "Brown Special" racing airplane, established a new straightaway record for its own class and defeated all competition in the unlimited, closed-course, Thompson-Trophy race, with the single exception of the racer flown by Col. Roscoe Turner.

The Menasco C6S is a six-cylinder, in-line, inverted air-cooled engine, with a bore of 4¾ and a stroke of 5⅛ in., giving it a displacement of 544 cu. in. Its compression ratio is 5.8 to 1. The dry weight is 428 lb., which for a racing output of 320 h.p. gives a specific weight of 1.33 lb. per h.p.

The chief characteristic of Menasco engines and the feature of greatest interest to automotive engineers is the inverted design, in which the cylinders are mounted beneath the crankcase. Prior to the development of this type of engine, all in-line aircraft engines were built with cylinders in an upright position, as in standard automobile practice. The primary reasons for the inverted design are its aerodynamic advantages, that is, improved vision for the pilot, a lower center of gravity of the engine, a higher propeller thrust line, and improved streamlining. There are also definite advantages in this design from an engine standpoint, such as improved cooling, lubrication, and carburetion; furthermore, the engine is placed in such a position that exhaust gases and noise are kept away from the pilot, the exhaust being blown along the bottom of the plane. All accessories are readily accessible, and valves, spark plugs, etc., are at the bottom of the engine, where they may be easily inspected or adjusted.

The C6S is of dry-sump type with the oil carried in an external tank and pumped through the engine under pressure. Cylinder walls are lubricated by spray from the bearings, while excess oil collects at the bottom of the crankcase, where it is dammed up by the cylinder skirts which project up into the case, and is pumped back into the reserve tank by a scavenging pump of approximately double the capacity of the pressure pump.

Heat dissipation is also improved in the inverted type, since the hottest part of the engine is placed on the bottom, where it is directly in the cold air stream.

The crankcase is cast of aluminum, while the cylinder barrels are machined from a solid forging. Cylinder heads are cast of aluminum alloy and are assembled to the cylinders and to the case by means of four hold-down studs per cylinder. A rubber gasket seals the cylinder to the case and a solid copper gasket seals the cylinder-head joint. The crankshaft is a Wyman-Gordon forging, drilled for weight economy and for pressure lubrication. It is machined all over. The propeller hub has No. 10 S.A.E. splines. Mounted on seven plain bronze-backed babbitt-metal bearings, the shaft is located by a single large ball thrust bearing just forward of the front main bearing. The forged Lynite connecting rods have a rounded I-section and two-bolt bearing caps. Pistons are cast of an aluminum alloy. Full-floating Nitralloy piston pins are located in the piston by means of duralumin buttons pressed into the ends of the pin. Four piston rings are used, three compression rings above the piston pin and one oil ring below. Pistons are of the full skirt type.

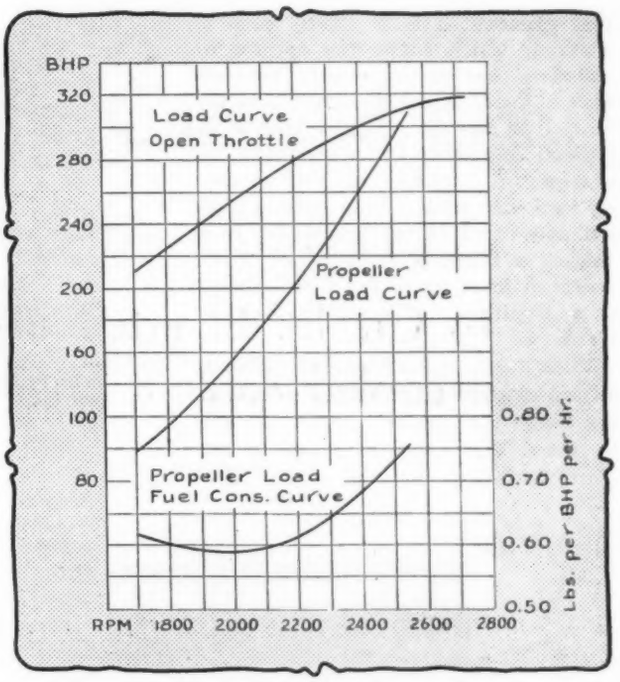
Crankcase cover, accessory case, supercharger scroll, carburetor air-in-

take pipe and intake manifold, oil-pump housing, crankshaft nose plate and miscellaneous small parts are cast of magnesium. The main bearing caps are magnesium forgings, and the supercharger impeller is machined from a magnesium forging.

Mounted on the rear of the engine is the accessory case in which are carried all of the accessory drive gears, and on which are mounted the two magnetos, the oil pump, the fuel pump, and the supercharger.

Supercharging is accomplished with a centrifugal blower direct-driven from the crankshaft through a gear train with a 10.4 to 1 ratio, resulting in impeller speeds of up to 30,000 r.p.m. An inter-cooler effect is obtained through the external mounting of the finned supercharger case and the long intake manifold. This permits of the use of high intake-manifold pressures without excessive temperatures. Owing to the high supercharge employed the compression ratio is kept moderate (5.8 to 1).

Another feature of the in-line design is the cross-flow cooling system with pressure baffling of the air flow. Cold air is scooped up along the right side of the engine and fed evenly across all of the cylinders. Air cooling is said to be aided also by efficient finning of the cylinder heads, together with fore-and-aft mounting of the valves, and rocker arms which provide for maximum air flow over the entire head.



Horse power and fuel consumption curves of Menasco C6S engine.

The C6S engine is strictly a development model which has been used for racing purposes. After further design work and testing, it is planned to place it on the market for commercial use.

Bohn Employs Spectrograph in Analysis of Non-Ferrous Ingots

TO raise the standards of purity and accuracy of analyses of its non-ferrous ingots, the Michigan Smelting and Refining Company, a subsidiary of the Bohn Aluminum & Brass Corp., is supplanting in many instances chemical methods of analysis and is using in its place the spectrograph. This marks a radical departure in the use of this instrument which up to this time has been found mainly in scientific laboratories where the ultimate in precision measurement is required.

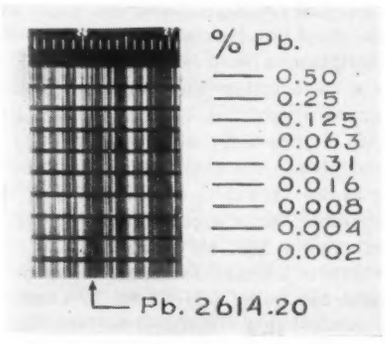


Plate I

Both qualitative and quantitative analysis may be accomplished very rapidly by use of the spectrograph. It is particularly suitable for quantitative analysis of those elements which are present in very small percentages, and for this purpose is found to be more accurate than chemical analysis.

When a material, for example, an alloy consisting of copper, zinc, and tin is burned in an arc, a composite spectrum is formed, in which the spectrum of each of the separate elements will be found.

Since the majority of the sensitive spectral lines lie in the ultra violet or "invisible" portion of the spectrum, it is necessary to use an instrument having quartz optical parts, because ordinary glass does not transmit ultra violet light. Fortunately, though not visible to the eye, the ultra violet portion of the spectrum can be photographed, in the same manner as "visible" light. The observations in this "invisible" region are, therefore, made by photography, and the photographic record, called a spectrogram, is then examined for the results.

The principle of quantitative analysis by the spectrograph is based upon the fact that, the higher the percentage of the element present, the more intense are the sensitive spectral lines of

that element. This is clearly seen in Plate 1, which shows the spectra of cadmium having increasing percentages of lead. It will be noted that the lead line having a wave length of 2614.20 Angstrom Units gradually increases in intensity as the percent of lead increases. This spectrogram and those that follow were taken on a Bausch & Lomb Medium Quartz Spectrograph installed in the Bohn Aluminum & Brass Corporation's Laboratories.

Plate 2 is a spectrogram illustrating an examination of cadmium base bearing alloys for presence of tin. It will be noted that samples 2 and 3 are

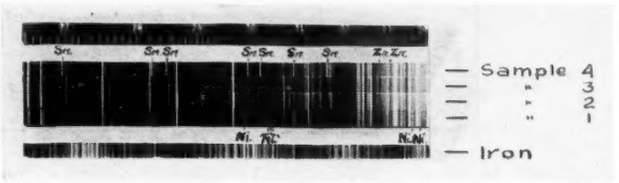


Plate 2

absolutely free from tin, while samples 1 and 4 are too high in tin content and could not be used. In addition, a study of the spectra shows that sample 4 is contaminated with nickel and zinc, and sample 1 with nickel. Such an examination serves as a very rapid check on the presence of undesirable elements.

Not only in the field of the manufacture of bearings has the spectrograph proved its value but also in the production of other alloys. To quote merely one example; the manganese content of German silver extrusion billets is maintained between the limits 0.10-0.20 per cent and Plate 3 represents a typical control analysis obtained, as a check on the quantity of this element present. The lower set of four spectra are standards having 0.03, 0.10, 0.15 and 0.25 per cent manganese. The upper eight spectra are samples, 1, 2, 3, 4 in duplicate. It is clearly evident from a comparison of the intensities of the sensitive spectral lines of managanese in the samples with those of the standards, that sample 2 is the only one outside the required specifications.

Further, all supplies of so-called "secondary" metals are checked to see that they contain no harmful impurities. A chemical analysis to determine all the possible impurities would obviously be very tedious.

Some of the more recent specifications covering wrought aluminum alloys for the aircraft and building industries and aluminum castings for

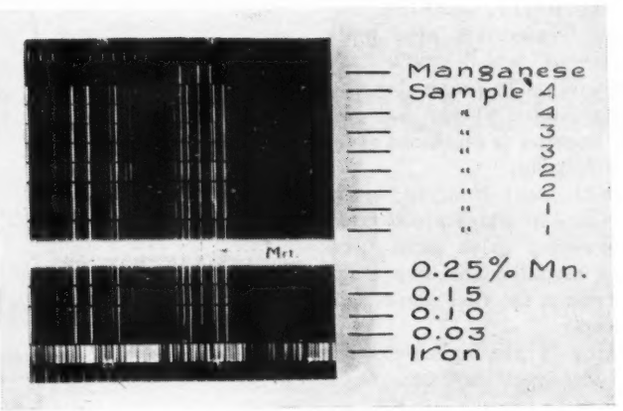


Plate 3

Government use stipulate such low maximum percentages of certain impurities that their determination in a chemical laboratory would require too much time and expense to be commercially practical. Here, again, spectrographic analysis is relied upon for quick and accurate determination of the very small amounts of the various impurities that are present.

French Engineers Offer Prizes to Spur Development of New Low-Priced Car

THE French Society of Automobile Engineers is of the opinion that what la belle France needs to pull out of the slough of depression is cheaper and more economical automobiles, and it has instituted a competition among its members for designs meeting what it considers to be the requirements of the times. The vehicle, which is to be known as the SIA car, is to have qualities somewhat like the following:

A sales price of about 8000 francs ($530 at the current rate of exchange), based on a daily production of 20 vehicles. It is to be a closed two-passenger car and is to have interior dimensions conforming to a dimensional sketch accompanying the rules and regulations. In addition to accommodating two passengers it must provide room for two suit cases measuring 28 by 16 by 8 in.

The maximum speed on the level is to be 46.5 m.p.h. and the fuel consumption is to be limited to 5 liters per 100 kilometers, which is equivalent to 47.5 miles per U. S. gallon, at a speed of 37 m.p.h. on Montlhery track. The acceleration is not to be less than 1.5 ft. per sec. per sec. under full load at 22.5 m.p.h. It is explained that this is equivalent to maintaining a constant speed of 22.5 m.p.h. up a 5 per cent grade. The operating cost must not exceed $20 per month for a monthly mileage of 625.

Proposals will be divided by the jury into three classes, viz., general plans, preliminary designs, and designs. The first must be accompanied by a general description and a sketch; the second by a description and assembly drawings to a scale of 10:1 showing three views of the car; and the third by a description, assembly drawings showing three views, to a scale of 5:1, dimensioned drawings of the principal components, and an outline of the performance characteristics expected. Prizes are being offered to the successful contestants. Entries for the three classes close on May 31, August 31, and September 30 respectively.

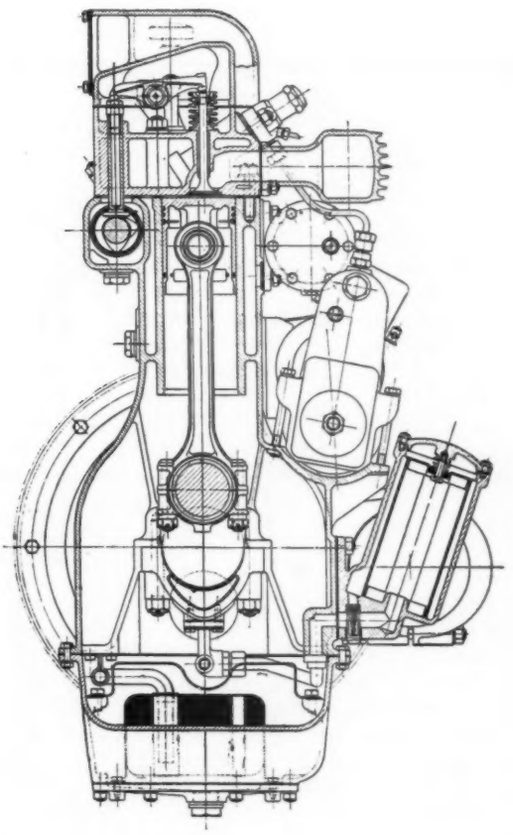
Small 4-Cyl. Diesel for Cars and Light Trucks Developed in England

A DIESEL engine said to be adapted for use on passenger cars, but which is most likely to find its widest application on light commercial vehicles for the present, is the Perkins Vixen recently announced by F. Perkins, Ltd., of Peterborough, England. It is a four-cylinder engine of 3-in. bore and 4¾-in. stroke, which is claimed to have a speed range of 300-4000 r.p.m. Its output is given as 16 hp. at 1000 r.p.m., 32 hp. at 2000 and 42 hp. at 3000.

As may be seen from the sectional drawings reproduced herewith, the design of the engine follows gasoline-engine practice rather closely. The combined cylinder and crankcase block, which extends a considerable distance below the crankshaft axis, is cast of chromium iron. The block has all of the brackets for accessories mounting cast on, yet the outside of the engine is remarkably smooth. The oil sump is a shallow casting of light alloy.

The cylinder head is a one-piece casting of chromium iron, of exceptional depth for rigidity, and is held in position by a large number of "through" studs. A "flame-resisting" gasket seals the joint between cylinder and head. The cylinder head is said to be of special design on which a patent has been applied for, which is probably the reason the sectional drawings reproduced herewith do not show the details of the combustion chamber. Rockers for operating the valves are mounted on top of the cylinder head and are covered by a light, oil-tight housing.

The crankshaft, of nickel-chromium-molybdenum steel, is supported in five bearings and has very large journal and crankpin diameters. It will be seen from the longitudinal section that the caps of the main bearings, which are made of steel, are of very rigid design. These bearings have white metal linings of special composition that is cast directly to the steel without intervening "backings." The thickness of the white metal is kept to a minimum. Connecting rods are drop forgings of alloy steel, with the bearing metal centrifugally spun into the big ends, while the small ends are provided with floating bronze bushes. Both bearings are pressure-lubricated.



Cross section of Perkins engine

Pistons are of aluminum alloy, with rather heavy crowns to enable them to carry off heat rapidly. Camshaft, fuel pump and idling governor are driven by a roller chain enclosed in an aluminum-alloy housing at the front end of the engine. This chain, which is provided with an automatic tensioner and with dampers to obviate chain whip, is said to be silent in operation. The camshaft is carried high up at the side of the cylinder block, but is so arranged that the cylinder head can be removed for a valve-and-carbon job without disturbing the camshaft and its timing. The tappets are relatively short and are carried in guides in the cylinder head over practically their full length.

Atomizers are located in the cylinder head and spray into the combustion chambers. The latter are said to provide a high degree of turbulence, which permits of the use of relatively low injection pressure and of large nozzle

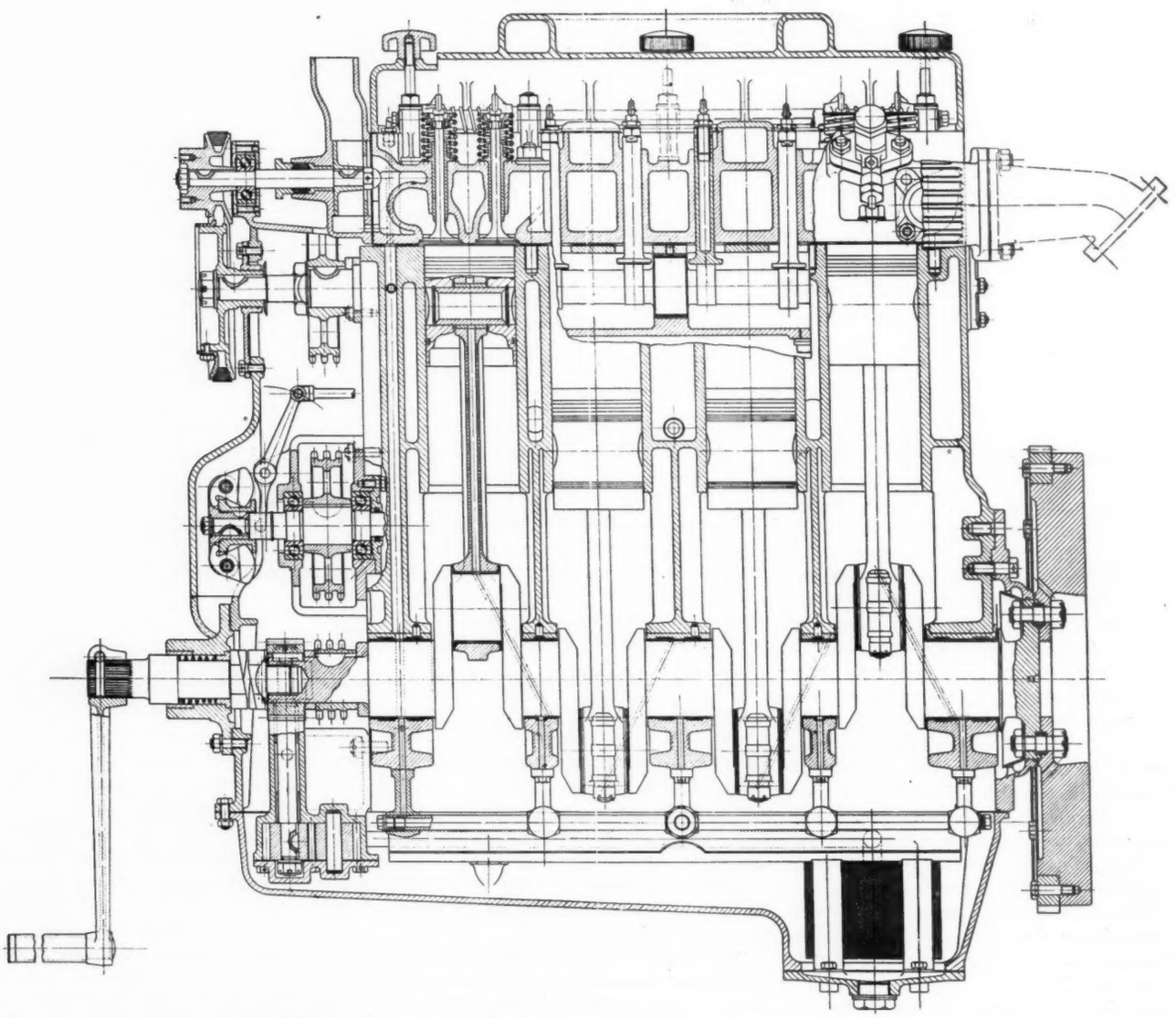
orifices, since penetration of the spray is not depended upon for the dispersion of the fuel and its combustion. Each nozzle is held in place by two nuts and can therefore be easily removed for inspection, cleaning, etc.

The fuel pump is a Bosch and is mounted on a slightly inclined base on the side of the engine opposite the camshaft. All of the injection pipes are of equal length; they are neatly arranged under the exhaust manifold, in such a way that they can be easily swung back if it is desired to test an atomizer in the atmosphere. Automatic timing of injection is provided for.

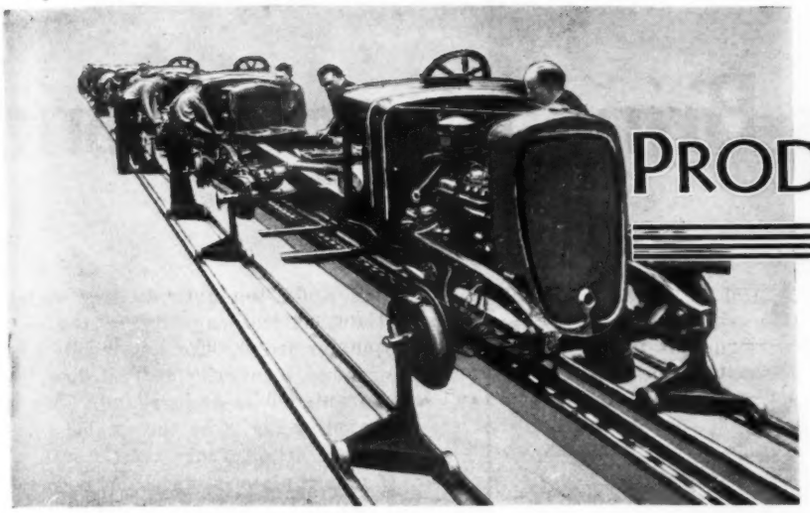
Lubrication is entirely by the pressure system, the oil being forced by the pump through a Tecalemite oil filter. The inlet passages are formed integral with the valve-gear cover, and the air inlets are protected by double strainers of ample area. An advantage of this arrangement is claimed to be that it obviates the need for special air cleaners. The crankcase is vented into the air inlet passages. The cast iron exhaust manifold is fully ribbed to keep down its working temperature, and is of such design that the downtake can be at the front or rear of the engine as desired. Its flange accommodates a 1¾-in. pipe for connection to muffler.

A centrifugal pump is provided for the cooling system and is mounted high up at the front of the engine, its drive being by belt from the end of the camshaft. A fan can be mounted on the projecting end of the pump shaft if one should be required. The engine is supplied with a starting crank remaining in place permanently.

The engine is provided with two facings and four studs on each side at the front for mounting purposes, while at the rear it is arranged to be carried by a steel banjo secured by a ring of bolts around the rear main bearing.



Longitudinal section of Perkins Vixen oil engine



PRODUCTION LINES

Metal Specials

Went through one of the biggest body hardware plants in this industry the other day. It's a revelation to see how they handle the production of sheet metal parts such as garnish molding, window trim, and the like. The operations are so different from what we see in an automobile plant that they're doubly interesting. Have you seen wood graining in real mass production—"smoking" finish over the grain by dextrous girls armed with air guns? Then the bending of window frame and reveals on ingenious machines that have never been pictured elsewhere. We are quite excited over this operation and may be able to tell you much more about it very soon.

All That Glitters

All that's black is not graphite. That's the burden of the discussion in Technical Bulletin 40.1, recently issued by Acheson Colloids. If you are interested in engine lubrication by all means read what they have to say about sludges and contamination. The important thing is—don't conclude that sludge is graphite because it is black.

Splits Hairs

Not the least of the advantages of being billeted in Detroit, as we will be from now on, is the privilege of attending the Ford Sunday night concerts. You get an entirely different picture when you see the thing first hand. W. J. Cameron's talk last Sunday had to do with the work of C. E. Johansson, master of scientific measurement, who was there in person. This reminded us of our visit to the Ford plant some years back and our amazement at finding Jo-blocks used right in the shop. Each operator was provided with a set of blocks specifically required at his station. This was the first time that these valuable gages had been used as anything but a master checking device.

Supercharging

If the signs point rightly we may expect to find a general spread of supercharging for passenger car and heavy-duty engines. Some engineers feel that heavy-duty engines, at least, are about as big as they can be and that increased power and performance must come through supercharging rather than increased size. One organization out here is taking the thing very seriously. They have started a research project designed to study supercharger design and expect to develop some fundamental information concerning engine performance through supercharging.

For the Factory

Tool engineers and maintenance men will be interested in a practical handbook just issued by Landis Machine Co. It's the fifth edition of the well-known treatise on Landis threading and tapping equipment. How to grind chasers, how to set chasers, operation, cleaning and repairing heads, special threads—these are just a few of the practical problems that are discussed in detail. Seems to us that this handbook is made to order for you. Ask us for a copy.

Down to Three

We hear that a new two-cycle aircraft engine has gone through its paces at the Dept. of Commerce. In the absence of actual details of design, what interests us most is the fact that this job is supposed to sell at $3 per horsepower. Isn't that something.

Doesn't Grow

Exhaust manifolds of NiResist have been rather popular lately on quite a number of heavy-duty engines. It must be a comfort to know that you can get a material relatively free of any tendency to grow and one which is free of permanent effects of high temperatures. Its higher coefficient of expansion is taken care of by using special expansion joints.

By Compression

Some of the gear failures which have occurred in highly stressed gear trains are attributed in some quarters to inordinately high compressive strains. The usual Lewis formula doesn't mean a thing under these conditions. Most of the recent investigation has been based upon the use of Jandesek's formula, which takes into account the changes in load-bearing area under heavy loads.

Cleenie Plug

AC has taken its old plug off the billboard, put it on wheels, and there you have either a desk ornament for yourself or a toy for the kids. Our little souvenir goes home. Did you get one—if not tell us about it.

—J. G.

MANUFACTURING MANAGEMENT METALLURGY

Steel Roofs Bring New Antenna I

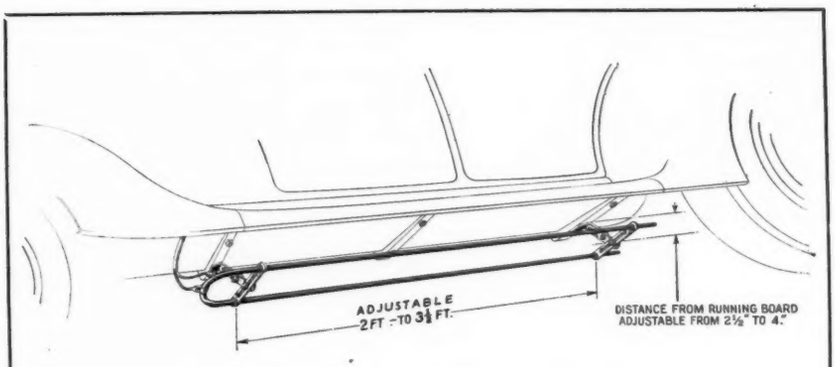


Fig. 1—RCA Dipolar antenna under running board

THE best location for the antenna of an automobile radio receiver is in the roof of the car, but the steel roofs on many 1935 cars make it impossible to locate the antenna there. Radio and car manufacturers therefore have been confronted with the problem of finding the next best location and the most suitable form of antenna for that location.

RCA Manufacturing Company's solution of the problem is the Dipolar Antenna mounted under the running board (Fig. 1). The antenna is made of steel tubing, 4 ft. long, with the two legs spaced 5 in. apart. A strap is provided for connecting the lead-in at the center of the U. Two special brackets are provided to mount the antenna underneath the running board and to adjust its height so as to provide the proper ground clearance. The antenna should be placed under the running board which is furthest from the ignition system. There are rubber grommets in the bracket to insulate the antenna from the metal structure of the car, and the antenna itself is protected against corrosive influences by being first copper-plated, then given a coating of baked dull-gray crackle enamel, and finally a coating of a special wax. These protective coatings are said also to offer adequate protection against electrical leakage to the car body due to the presence of dirt, grease, ice, water, etc. A low-capacity transmission line is supplied with the antenna, and for maximum noise reduction this should be grounded to the frame of the car at a point near the antenna. The transmission line should be run as directly as possible to the receiver and kept away from ignition wires.

It is admitted that this antenna does not give as powerful a pick-up as the roof antenna; on the other hand, ignition noise is said to be much less with it than with the roof antenna in many instances.

As this antenna was specially designed for auto radios, some of its "reasons why" may be of interest to automobile engineers.

The antenna is generally regarded as a conductor which for best pick-up must be strung high above the ground, and it will no doubt come as a surprise to many that with this particular running-board antenna the pick-up is best when it is in the lowest practical position, which is determined by considerations of road clearance. The reason can be readily explained by reference to Figs. 2 and 3. Radio signals induce a voltage in the car body, the latter acting as a flat-top antenna, and owing to the electrical capacity of the condenser formed by the automobile and the ground, a capacity current flows between automobile and ground. This is indicated in Fig. 2 by the symbol (sine curve) of an alternator at the left.

If now a plate is placed between the car and the ground, and a radio receiver connected to the car and plate respectively, there will be a capacity current between ground and plate, but to complete the circuit to the car the current will have two paths, one being through the capacity between the car and the plate, and the other through the receiver. These two paths are in parallel, and the assembly acts as a capacity voltage divider which is similar in its action to the more familiar resistance voltage divider illustrated in Fig. 3. In the latter diagram there are two resistances connected in series between the car and ground, and the receiver is connected to the car and to the junction between the two resistances. It is well known that in this case the greater the resistance across which the receiver is shunted, relative to the other resistance, the higher the electro motive force applied to the receiver or, in other words, the greater its pick-up. Similarly in Fig. 2, the greater the impedance of the capacity across which the receiver is shunted, relative to the capacity in series therewith, the greater will be the pick-up. Now, the capacity impedance increases with the distance between the two conductors forming the capacity, hence by moving the plate *B* closer to ground the plate-ground impedance decreases while the plate-car impedance increases, hence the pick-up increases. In practice it is found that the best location is on a level with the lowest part of the chassis, which combines good

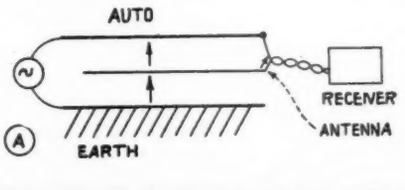


Fig. 2 — Circuit diagram with Dipolar antenna

Installation Problems

by P. M. Heldt
Engineering Editor,
Automotive Industries

pick-up with reasonable protection against mechanical injury.

The next question that arose was with regard to the best diameter (area) of the antenna. The object, of course, is to assure the greatest energy input into the receiver for the particular location of the antenna. The problem is similar to that of the resistance of an outside line connected across the terminals of a battery of given internal resistance to assure the greatest possible expenditure of energy in the outside circuit. It is generally known among electrical men that this requires an outside resistance equal to the internal resistance of the battery. The electromotive force active in the outside circuit is then equal to one-half of the electromotive force of the battery. If a smaller outside resistance were used, the current would be increased, but at the same time the electromotive force across the outside line would be reduced and the product of current and line electromotive force would be less. Similarly, if the resistance of the outside circuit were increased, then the electromotive force active in it would be increased, but the current flowing would be reduced, and the product, that is the energy developed in the outside circuit, would be less.

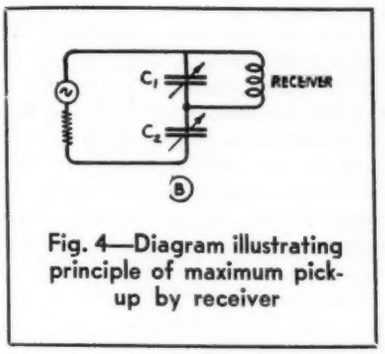


Fig. 4—Diagram illustrating principle of maximum pick-up by receiver

The electrical circuits of the car radio are represented diagrammatically in Fig. 4. There is one capacity between antenna and ground, another between antenna and car, the two being in series, and the receiver is connected between the junction of the two capacities and the car. The values of both capacities increase directly with the size of the antenna, hence the impedances vary inversely as the size of the antenna. If the antenna were made very small in diameter so that the two impedances were great, then practically all of the current flowing between car and ground would pass through the receiver and little through capacity C_1. But since the current has to flow through the high impedance C_2, the total amount of current will be small, and even though the receiver carries a large proportion of that current, it does not get very much. If, on the contrary, the impedances were made small by using a large antenna, then a comparatively large current would flow between car and ground, but most of it would pass through capacity C_1 and only a small proportion through the receiver. Hence the conclusion seemed justified that a definite size of antenna would give the best pick-up and that either a smaller or a larger size would result in reduced pick-up. Experiment showed this to be the case, the pick-up varying with the antenna diameter as shown in Fig. 5.

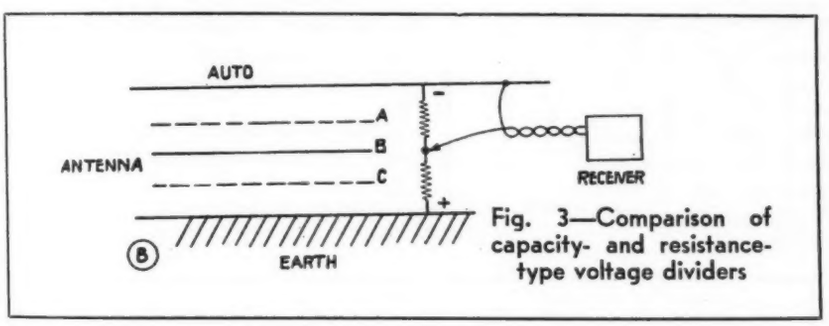


Fig. 3—Comparison of capacity- and resistance-type voltage dividers

The particular form of the antenna and the instruction to connect the lead-in wire at the middle of same also are based on logical reasoning. A good deal of the interference experienced with car radio comes from the ignition system, which sends out electrical vibrations with a principal wave length of the order of seven meters. These emanations, of course, will induce corresponding high-frequency electromotive forces in the antenna, and the problem is to prevent these electromotive forces from affecting the receiver. This is accomplished by so designing the antenna that its natural frequency as an electrical oscillator is equal to that of the radiations from the ignition system. The electromotive force of each end of the antenna will pass through complete cycles at a very rapid rate, being soon positive and soon negative; and the opposite end will at all times be 180 deg. out of phase with it, being at its maximum negative value when the first is at its maximum positive value, and vice versa. This creates a node at the middle of the length of the antenna, a point at which there is no change in the electromotive force due to the inductive effect of the ignition currents, and it is at this point that the lead-in wire is connected. If the point of connection is moved toward one end or the other, an objectionable noise generally appears in the receiver. For minimum noise pick-up, the antenna generally must be mounted parallel with the running board.

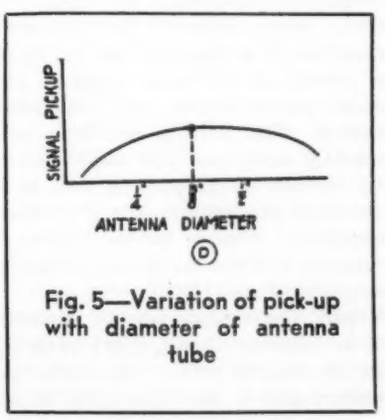


Fig. 5—Variation of pick-up with diameter of antenna tube

Engine Knock Characteristics S

IN the course of an investigation of flame movement within a gasoline engine, conducted in the Mechanical Engineering Laboratory of Stanford University, certain peculiarities of knocking explosions were found by the writers, which they believe to be of general interest.

The method of investigation was essentially that employed by Schnauffer (see *Automotive Industries* of May 14, 1932, and July 16, 1932, and *S. A. E. Journal*, Vol. 34, No. 1), and more recently by Rabezzana and Kalmar (see *Automotive Industries* of March 9, 1935), who utilized the increased ionization of a burning gas to record the arrival of the flame front at successive points within the combustion chamber. This method has been independently developed and used successfully by one of the present writers in a previous preliminary study of flame propagation. (Thesis for the Degree of Engineer, William A. Mason, Stanford University, June, 1932.)

Briefly, the method may be summarized as follows: Small, spark-plug-like gaps are located within the combustion chamber, and a small potential is applied across each gap. By means of suitable vacuum-tube amplifiers the current fluctuations within the gap circuits are magnified and may be recorded by an oscillograph of the ordinary Duddel type. Heretofore the gaps placed in the path of the flame have been used solely to determine the velocity pattern of the flame's movement across the combustion chamber. However, the writers believe that the method can be made to yield certain additional information about the combustion reaction.

Fig. 1 shows the general arrangement of apparatus. Two gaps were located within the combustion chamber of a 3 by 3¼-in. single-cylinder, air-cooled engine; one adjacent to the spark plug (Gap 1), a second at a point over the piston about an inch and a half from the far end of the chamber (Gap 2). By means of small extensions, the location of the gaps was changed from time to time during the course of experimentation, in order to explore a greater area in the vicinity of each plug.

Pressure variations within the chamber were recorded by a McCollum-Peters carbon-pile telemeter. Since the oscillograph used did not have sufficient current sensitivity to be operated by the telemeter bridge circuit alone, it was found necessary to construct a vacuum-tube amplifier for the indicator.

Fig. 2 is a copy of a typical oscillogram. Time is read from left to right.

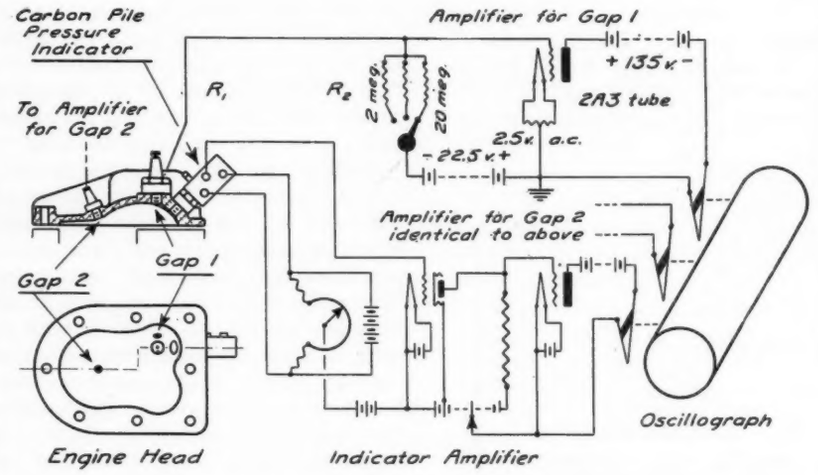


Fig. 1—Diagram of experimental apparatus

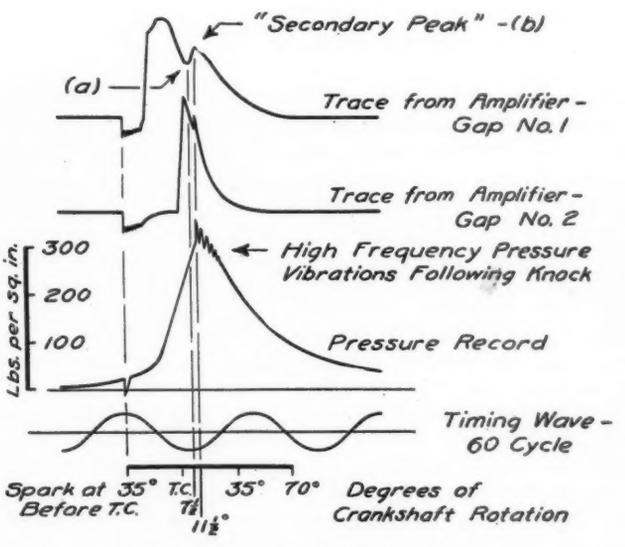


Fig. 2—Typical oscillograms from knocking engine

Studied by Ionized Gap Method

by William A. Mason
and Kenneth M. Brown

IN this article the authors describe experiments in which ionized gaps in different parts of the combustion chamber were used to determine the arrival of the flame fronts in these parts and for other purposes. The records of current flow across these ionized gaps show peaks which undoubtedly indicate the moments when the flame fronts arrive at the respective gaps; in case of detonating combustion they also show secondary peaks, following the primary peaks at short intervals, for which the authors found it difficult to give a satisfactory explanation. It seems to us that a plausible explanation of these secondary peaks is as follows:

The two upper curves (traces from amplifiers of Gaps Nos. 1 and 2) are not pressure variations but variations of the electrical conductivity of the ionized gaps. These conductivities probably depend on nothing so much as on the temperature at the gap. This is borne out by the fact that the conductivity curve for Gap 1, which is located close to the ignition points, rises sharply immediately after ignition, whereas the sharp rise in the conductivity curve for No. 2 gap, about 3 in. away, occurs quite some time later, evidently when the wave front reaches there. As the wave front passes beyond Gap 2, the temperature at the gap undoubtedly drops somewhat, and the conductivity of the gap decreases. Some time later the simultaneous inflammation of all the remaining unburned charge (the knock) occurs, and the great amount of energy liberated thereby results in an increase in pressure and temperature throughout the rest of the chamber, the increase at the ionized gaps being indicated by the secondary peaks.—Editor.

The trace at the top of the record is from the gap nearer the spark plug, the second trace is from the more distant gap. Directly below these appears the pressure-time trace from the indictor, and below it the 60 cycle timing wave. The instant of ignition is indicated by the simultaneous dips in the traces from both gaps and indicator.

Before any interpretation of such an oscillogram is possible it is necessary to review the characteristics of the amplifying circuit employed. The ideal circuit is one in which any current flowing across the gap within the combustion chamber will be proportionally magnified in the output. In practice, however, this is not feasible, for if the constants of the circuit are so adjusted that it responds to fairly large current changes, small changes will pass unnoticed, and conversely, if the circuit be adjusted for an extremely small current flow, it will be impossible to investigate satisfactorily the larger changes of current.

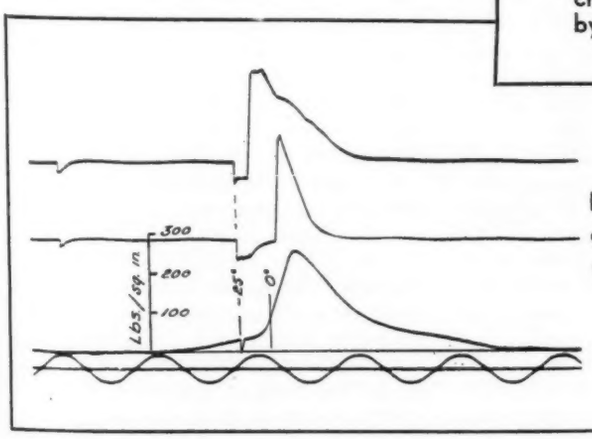


Fig. 3 — Oscillogram from engine running on ethylized fuel

It was found that when the advancing flame front of an explosion reached one of the measuring gaps, the resistance of the gap dropped to about 2×10^6 ohms. Under these conditions it would naturally seem desirable to employ an input resistance, R_2 Fig. 1, of approximately the same magnitude, making the circuit sensitive to fairly large changes of resistance across the measuring gap above and below this initial value of 2×10^6 ohms.

If the circuit is to be made sensitive to the flow of much smaller currents across the gap, it is then necessary to make the value of R_2 higher. Suppose that R_2 be made 20×10^6 ohms and assume, as before stated, that when the flame front crosses the gap the resistance of the gap is about 2×10^6 ohms. With R_2 equal to 20×10^6 ohms the grid of the vacuum tube is negative with respect to the filament by only a small amount. The plate current then has a value almost as great as when the gap is directly short circuited, and fairly large variations in resistance across the gap are recorded only as almost imperceptible changes in output. After the passage of the

flame front, the resistance of the gases increases very rapidly, so that small variations in their conductivity are readily amplified in the circuit. By the use of a high input resistance, R_2, the interesting peculiarities of wave form which the writers found characteristic of knocking explosions were made clearly evident.

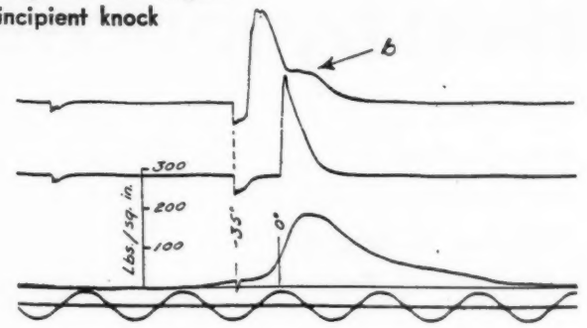
The choice of a vacuum tube for the circuit depends upon the current output required. With the 2A3 type tubes, which have a very high mutual conductance, currents as high as 100 M. A. were easily obtained in the plate circuit. It was found advisable to use separate "B" batteries for each tube. When a single set of batteries was used for two tubes, the large current drain in the plate circuit of one amplifier influenced the plate current of the other.

The initial phases of the investigation were devoted to a study of the inception of flame movement in the immediate vicinity of the spark plug. The work of Duchene (N. A. C. A. Tech. Memos. Nos. 547, 548, and 694) with carbureted mixtures in bombs seemed to indicate that a direct correlation existed between the length of lag after ignition and the severity of the explosive wave, i. e., the time required for the flame to start to move across the chamber in a detonating explosion appeared materially greater than in normal burning. The writers have never observed this effect in any of the published photographs of knocking explosions in spark ignition engines which have come to their attention; and the results of this investigation, in which engine r.p.m., time of ignition, air-fuel ratio, compression ratio and type of fuel were systematically varied, indicate that in a working engine the delay between the passage of the spark and the moment the flame front starts to move across the combustion chamber is no greater in a knocking explosion than in a non-knocking one.

The second phase of the investigation was concerned with the study of wave forms obtained from explosions in which typical engine knock occurred.

In a normal or non-knocking explosion the advance flame front, as it reached a gap, caused the trace on the oscillogram to rise abruptly to an initial peak similar to those of Fig. 2. Both traces then descended smoothly to their base lines. When the engine was operating under knocking conditions, the trace from Gap 1 always exhibited a secondary peak, (b) Fig. 2. This second peak had its inception, (a) Fig. 2, several degrees of crankshaft rotation *before* the pressure record indicated the instant of knock, and always reached a maximum value *simultaneously* with the sudden rise in pressure which is associated with the phenomenon of engine knock. Occasionally the trace from Gap 2 showed a small second peak just at the instant of knock.

Fig. 4—Oscillograms from engine with incipient knock



The trace from Gap 1 started to rise to its secondary peak anywhere from 4 to 14 deg. of crankshaft rotation before the instant of knock, depending upon conditions of engine operation. This secondary peak indicates, of course, a reionization of the wholly or partially burned gases in the vicinity of the spark plug behind the still advancing flame front. The interesting fact is its appearance before the pressure record contains any indication of knock.

Operating the engine on fuel doped with Ethyl (6 cc. per gal.) restored the smoothness of the trace from Gap 1, as is shown in Fig. 3.

The pressure-time traces from the indicator in knocking explosions—following the sudden, sharp rise of pressure at the instant of knock—exhibited small, high frequency vibrations which, although decaying rapidly, often persisted for a considerable distance down the expansion curve. These vibrations were of the order of 5000 cycles per second, with occasionally a beat frequency of 1/10 to 1/11 of this value appearing. Similar high frequency pressure vibrations have been noticed by Withrow and Rassweiler (*The Automobile Engineer*, August, 1934) and by C. S. Draper (N. A. C. A. Report No. 493). They are attributed to longitudinal vibrations of the gas column within the combustion chamber.

Fig. 4 shows an oscillogram taken under conditions of engine operation similar to those which were obtained when the oscillograms shown in Fig. 2 were made, except that the compression ratio was lower in the case of Fig. 4. The flat top of the pressure record indicates a slight, so-called incipient knock. It may be seen that the trace from Gap 1 shows a partially developed secondary peak in this case—(b) Fig. 4. When the engine was operating in the critical range just between non-knocking and knocking conditions, so that only an infrequent "ping" was heard, the trace from Gap 1 would occasionally exhibit a slight or only partially developed secondary peak without any accompanying indication of knock appearing on the pressure-time trace.

A satisfactory explanation of the phenomenon of these secondary peaks and its application to theories of engine knock are difficult. Not only are all the factors which affect the electrical conductivity of flames somewhat obscure, but the laws under which each factor acts have not, as yet, been completely formulated.

A possible explanation for the appearance of these peaks may lie in the so-called "after glow" or re-illumination of the gases within the combustion chamber, which has been observed by Withrow and Rassweiler to occur, paradoxically, before the time of knock. They state (in *The Automobile Engineer* for August, 1934):

"This re-illumination or 'after glow' first occurs *before* the time of knock, and is apparently induced by the rising pressure. At the time of knock there is further and more intense re-illumination. On the basis of present information it appears that the carbon dioxide molecules are excited thermally by a rise in temperature produced by rapid compression." [The italics are ours.]

A combination of the ionized gap and photographic methods of flame study would, the writers believe, be a very valuable tool for research in the field of engine knock.

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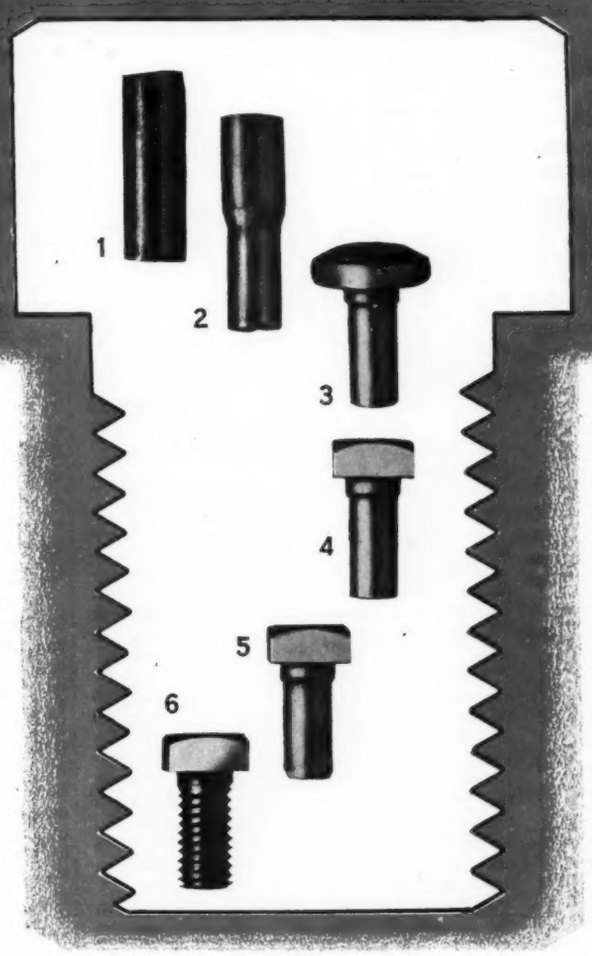

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The accuracy with which J&L Cold Heading Wire makes up is shown by the progress pictures of a bolt in the several stages of forming. 1. Blank, 2. Extruded Blank, 3. Headed Blank, 4. Trimmed Head, 5. Pointed, 6. Threaded. Other parts finished or in progress, are shown below.

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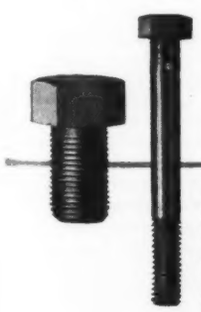

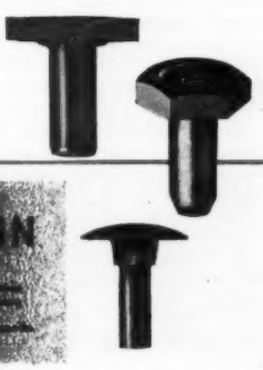

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April May Top 468,281 of '30

(*Continued from Page* 559)

Analysis of 3500 retail sales of 1935 Pontiac cars reveals that car buyers are laying down more actual cash than they have for years, that a large percentage of cars over three years old are being traded in and that a high percentage of purchasers are stepping down from a higher-price class.

Salesmen led the field in the purchase of new Pontiacs, supplying 16.8 per cent of the company's business so far this year. Running a close second were professional men with 15.8 per cent of total purchases, followed by executives with 13.1 per cent. Fourth on the list were tradesmen, who accounted for 12.1 per cent. Other important classifications in order of volume are: factory workers, Government employees, rural workers, teachers, railroad workers and office employees. It is significant that in 51 per cent of the 3500 sales studied, purchasers paid cash for their cars or at least the cash difference between the used-car allowance and new-car price. That high percentage of cash, according to Salesmanager A. W. L. Gilpin, tallies with reports received from General Motors Acceptance Corp., which finances all GM time sales.

Cars two years old represent the largest number of any one year traded in, accounting for 25.9 per cent. Cars over three years old represented 43.7 per cent of the trade-ins. More than half, or 52 per cent, of the cars were traded in at an allowance of $350 or less. Only 19.6 per cent represented allowances of more than $500. Of the total trade-ins 48.4 per cent covered cars in the lowest-price field, where owners were stepping up into a higher bracket, while 51.6 per cent represented owners of higher-priced cars, who were stepping down to a lower-price field.

Retail deliveries of Ford V-8 trucks and commercial cars in the first three months this year totaled 53,167 compared with 24,564 units in the corresponding period of last year, according to reports received by the factory from its 34 branches throughout the United States. This is an increase of 116 per cent.

Retail sales in U. S. by Chevrolet to the end of March were the largest for any first quarter in five years, showing a gain of 23.2 per cent over the first three months of 1934. While both trucks and passenger cars shared in the gain, the latter led with an increase of 31.5 per cent. With more than 74,500 orders carried over into April, present demand requires operation of all Chevrolet manufacturing and assembly plants at the maximum rate through April, and the company looks to continued heavy demand through May and well into mid-summer.

Retail sales of 40,332 Chevrolet trucks during first quarter established a six year record exceeded only once in the company's history, that was the first quarter of 1929. Sales of 5365 trucks in the first 10 days of April represented a greater increase than was shown by the first quarter. Marked increase in registrations of half-ton trucks reflects improving economic condition of small merchants whose business was the first to suffer in the depression. Trucks of half-ton capacity, used by small places of business, showed a gain of 93 per cent in registrations thus far reported.

Plymouth retail sales hit a new all-time peak during week ended April 20, when dealers delivered 9985 cars, an increase of 1.3 per cent over the preceding week and 27 per cent over the corresponding week a year ago. In the first 16 weeks of this year, Plymouth dealers have delivered 116,888 cars, compared with 81,787 in the similar 1934 period, an increase of 42.9 per cent. Approximately 18,000 used cars were delivered by Plymouth dealers during the week of April 20 and stocks are reported to be in healthy condition.

Chrysler dealers, who twice during April established records for new car deliveries report that used cars are moving at a good rate and that the present inventory is sufficient for five weeks on the basis of current sales. While the actual number of used cars on hand on January 1 was somewhat smaller than now, turnover was slower, there being at that time approximately eight weeks' supply. Only in a few isolated cases where the weather has been exceptionally unfavorable, the company reports, have dealers found difficulty in moving used cars and this situation will adjust itself with the coming of real spring. During week ended April 20, Chrysler dealers delivered 3793 Plymouths and 1,094 Chrysler cars, a total of 4887 units which compares with 4844 for the preceding week. This brought Plymouth deliveries by Chrysler dealers during the first 16 weeks to 44,786 and Chryslers to 11,884, a total of 56,670 units or 56.2 per cent more than in the similar period of last year.

Retail sales by Dodge dealers swung upward again during week of April 20, when 7788 Dodge and Plymouth passenger cars and 1300 Dodge commercial cars and trucks, a total of 9088 units, were delivered compared with 8360 in the preceding week. Dealers also reported used car and truck deliveries increased to 8124 from 7810 the week before.

Buick deliveries advanced sharply in the second 10 days of April to 2552 from 1676 in the first 10 days and compared with 1590 in the second 10 day period of April last year. Over 5000 orders are on hand at the Buick factory which is turning out cars at the rate of 7000 a month, with indications that this production rate will be maintained in May. Buick dealers have just a little over four weeks' supply of used cars on hand, based on current sales rate.

Oldsmobile dealers delivered 6652 cars in the second 10 days of the month against 5630 in the preceding 10 day period and 2950 in second 10 days of April last year. Deliveries for the year to date total 45,664 compared with 14,696 in like 1934 period.

Hudson-Terraplane deliveries are still climbing with buyers taking delivery of 2275 cars in the week ended April 20 against 2184 the preceding week. Compared with the same week a year ago the gain was 16 per cent. One reason for the better showing is the fact that Hudson has more retail outlets than at any time since 1930, the total being 2956 in United States alone. Company reports its new car stocks are 20 per cent under normal for this time of the year, or less than two months' supply, and that dealers' used car inventories are in good shape.

Sales in the second 10-day period of April were the best that the Cadillac Motor Car Co. has enjoyed in the last four years. During this 10 day-period more Cadillac and LaSalle cars were sold than in the combined corresponding periods of both 1934 and 1933. The company still has on hand unfilled orders for 3000 Cadillac and LaSalle cars.

AFL Blames ALB For Toledo Strike

(*Continued from Page* 559)

stantially to a satisfactory settlement."

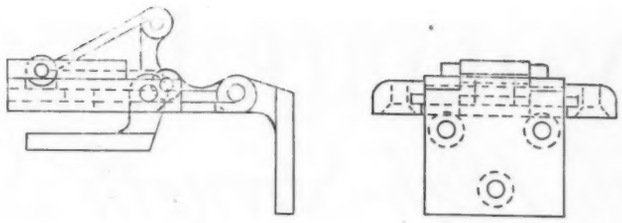
Detroit labor students, delving beneath the surface, are not in complete agreement as to the motivating forces behind the strike. Some see in it further window dressing for the Wagner Bill and A. F. of L. strategy to get rid of the Wolman Board. The Federation makes no secret of the fact that these are two of its main objectives at the present time but does not admit that it promoted the Toledo strike, claiming instead that the calling of the strike was unauthorized action by the local.

To observers it appears more than a coincidence that the strike was called on the eve of the Automobile Labor Board's final election and at a plant where the Board's nominating elections showed the Federation to be particularly strong. They charge that the union has been looking about for just such an opportunity to make a demonstration now when the Wagner Bill is up for consideration and that the demands that were made suggest that no serious grievance existed.

Others are of the opinion that the Toledo difficulty may be accounted for by the aggressiveness of certain local leaders who, flushed with victories in other Toledo strikes, are bent on enhancing their power and bringing under union domination an important General Motors plant. They are inclined to discount the broader aspects of the move ascribed to it by some.

The situation currently holds little promise of early settlement in view of the position taken by strike leaders in refusing to consider the compromise proposals made by company officials and the stand of Alfred P. Sloan, Jr., General Motors president, who looks upon the whole affair as a closed shop issue. "The vital question involved," says Mr. Sloan, "is whether General Motors Corp. is willing to sign an agreement for a closed shop, recognizing the local union as the exclusive representative of all the employees of its Toledo plant. This General Motors will not do." He says that wages at the plant were at the highest level ever paid, on a par with or higher than the wages for similar work in the Toledo district. Strike leaders deny that they are making an issue of the closed shop, that the question was not a part of the demands made. But General Motors, espousing the proportional representation plan of the ALB, is unwilling to make any deal with the Federation as representative of all employees in any plant.

Just how long the Toledo shut-down can continue without affecting the production pace of its assembly plants is not definitely known but it is understood that Chevrolet has a two weeks' supply of transmissions and that when the plant resumes operations production can be stepped up to between 6000 and 7000 a day, its capacity, which would assure adequate day to day supply for assembly operations of both Chevrolet and Pontiac. The body shortage experienced earlier in the year, particularly by Chevrolet, permitted other departments to build up a bank of parts from which to draw on in the peak production season, and this inventory is said to be not yet exhausted. Should the strike continue beyond a couple of weeks it would of course prove to be a serious handicap to the production of cars.



This concealed door hinge is made of cadmium-plated steel

New Concealed Door Hinge

Following some of the discussion in *Automotive Industries* on the utility of using concealed door hinges in passenger car bodies, we are advised by Ackerman-Bleasser-Fezzey, Detroit, makers of the well-known line of "Common-Sense" window regulator, that they have developed a new hinge which has attracted a good deal of comment. The hinge illustrated here is made of steel, cadmium-plated for protection against rusting and corrosion, and easy to keep lubricated.

This hinge has been designed for a door opening of 90 degrees with a 1-in. fulcrum, but both fulcrum ratio and door opening may be modified to suit certain special requirements. It is claimed that this hinge is not expensive to make. Moreover, it embodies a stop device which is expected to eliminate the door check strap, thus reducing the all-around cost of the construction.

While the advantages of the concealed hinge have been discussed in *Automotive Industries* on occasion, certain outstanding features attributed to the design described here are well worth noting. From the viewpoint of the body stylist, the concealed hinge aids in completely cleaning up the exterior lines of the body by eliminating the unsightly projections at the doors. It offers a better opportunity for improving the color treatment and striping and provides a good talking point on streamlined jobs.

From the viewpoint of the production department the concealed hinge seems to have many significant advantages, according to claims made by the manufacturer. In the first place, usually only two concealed hinges are required per car and the press operations of piercing these hinge niches are entirely eliminated. The hinges are interchangeable, making it unnecessary to handle and stock rights and lefts.

Since the hinge requires only shallow cutting of pillars, its use produces a stronger pillar construction without sacrificing clearance for body contour. Operations in the paint department may be simplified, since the body can be striped and polished mechanically without interference from projecting hinges.

The hinge acts as a retractable element using a broad sliding plate which carries the lower end of the fulcrum link forward in a horizontal line. This large, well-fitted bearing area seems to promise good door alignment and freedom from door-sagging.

"Gold Seal" Piston Ring

The Skinner Chuck Company of New Britain, Conn., has placed in production a new type of piston ring known as the "Gold Seal." It is made of cast iron but has an inlay of non-ferrous metal at the center of the outer surface, or else two such inlays, each in a separate groove. It is claimed for these rings that they wear down more rapidly to a good seal and that they retain their tension and their sealing characteristics longer. At present the ring is being used regularly as the top ring by a manufacturer of high-speed Diesel engines and also exclusively by a manufacturer of air compressors.

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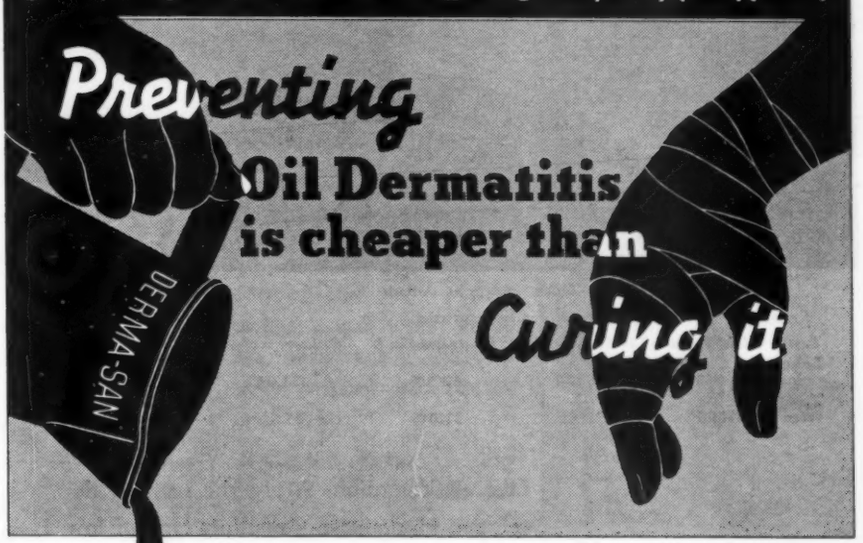

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Protect your men from this serious skin disease by sterilizing cutting compounds with Derma-San. One pint, added to 35 gallons of lubricant, ends all danger of infection. Thousands of plants use Derma-San. They know they cannot afford to be without it.

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A Tough High-Strength Steel with Exceptional Welding Qualities

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Physical Characteristics

Test	*Yield Point*	*Tensile Strength*	*Elongation in 8"*	*Reduction of Area*
Longitudinal	61,650	82,700	32.5%	73.0%
Transverse	61,000	81,700	31.0%	65.5%

6" x 6" x $\frac{9}{16}$" Angle; as rolled

Physical Characteristics

Test	*Yield Point*	*Tensile Strength*	*Elongation in 8"*	*Reduction of Area*
Edge	67,300	85,250	21.9%	68.2%
Corner	67,050	89,700	19.4%	61.9%

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